Mountain Goat Management Report

of Survey-Inventory Activities
Federal Aid in Wildlife Restoration
1 July 1997–30 June 1999

Mary V. Hicks, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2000

Please note that population and harvest data in this report are estimates and may be refined at a later date.

If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2000. Mountain Goat Management Report of Survey-Inventory Activities. Federal Aid in Wildlife Restoration 1 July 1996–30 June 1999. M. Hicks, editor. Juneau, Alaska.

If used in part, the reference should include the unit number, page numbers and author's name, which can be found at the end of each unit.

Funded through Federal Aid in Wildlife Restoration, grants W-27-1 and W-27-2.

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
Frank Rue, Commissioner

DIVISION OF WILDLIFE CONSERVATION
Wayne L. Regelin, Director

Free copies of this report and other Division of Wildlife Conservation publications are available to the public. Please direct requests to our publications specialist:

Mary Hicks
Publications Specialist
ADF&G, Wildlife Conservation
P.O. Box 25526
Juneau, AK 99802
(907) 465-4190

LOCATION

GAME MANAGEMENT UNIT: 1A (5000 mi^2)

GEOGRAPHIC DESCRIPTION: Ketchikan area including mainland areas draining into Behm and Portland Canals

BACKGROUND

Severe winter weather conditions during 1968–1975 resulted in up to 90% reductions in Unit 1A mountain goat populations (Smith 1984). Subsequent moderating weather enabled goat populations to recover and we believe the subunit populations are currently stable at moderately high levels.

Steep, glacially created valleys and peaks in Unit 1A provides important escape terrain for goats from predating wolves and bears. Alpine vegetation consists of heath fields and provides goats with nutritious forb-sedge meadows. At lower elevations dense stands of old growth forest provide necessary cover, and shrubs and evergreen forbs provide goats with important foods during critical winter months.

Although goats historically inhabited only the subunit's mainland, they now occur on Revillagigedo Island as a result of introductions to Swan Lake (17) in 1983 (Smith and Nichols 1984) and Upper Mahoney Lake (15) in 1991 (ADF&G Unpubl. data, Ketchikan). These areas were selected as translocation sites because they appeared to have suitable escape terrain and wintering habitat. The Swan Lake population has increased substantially since its introduction and we believe it now numbers roughly 250 goats. This increase prompted a hunting season in the vicinity of Swan Lake in 1993. We estimate that the Upper Mahoney Lake population currently consists of about 50–60 goats. At present there is no open hunting season for that small introduced population.

Hunter harvests from Unit 1A averaged roughly 45 goats each season during 1972–1988. The average annual harvest dropped to just over 25 during the past 9 seasons as a result of 1989 legislation requiring nonresident goat hunters to hunt with registered guides. Cyclic and unpredictable weather severity, healthy predator populations, and density-related over-foraging of habitat, are believed to be more influential than hunting in modifying the subunit's goat populations.

To monitor population changes caused by winter weather, over-foraging, and predation, the department attempts to complete aerial surveys of established trend count areas each late summer and fall. Although we believe survey results generally reflect population trends, we have found that weather conditions immediately prior to and during surveys can greatly influence our ability to observe goats and hence to accurately estimate actual numbers.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1. Maintain goat population densities that provide greater than 20 goats per hour of survey time during fall surveys, and when not achieved, determine probable causes.

2. Survey goats annually in established trend count areas throughout Unit 1A.

3. Monitor sex composition of the harvest and manage for < 6% harvest of observed number of goats using a weighted harvest point system.

METHODS

We attempt to survey at least 6 of the unit's 12 established trend count areas (TCAs) each fall as weather and schedules allow. TCAs vary in size from 23–200 mi^2. We generally initiate surveys during September or early October between 1700–1900 hours. A PA-18 Supercub with a pilot and observer is flown at a height of 200–300 feet above the ground. Both the pilot and observer search for goats, and the observer records observations on a 1:63,360 topographic map. We classify goats as either adults or kids, and make no effort to ascertain sex or distinguish other age groups.

We obtain harvest information through a mandatory hunt report that is part of a required registration permit. Information we collect includes the areas and numbers of days hunted, hunter success, dates of hunts and kills, transport methods, and commercial services used. Successful hunters who pursue a second goat are treated as separate hunters for the purposes of calculating and presenting hunt and harvest information.

A weighted point system is applied to all trend count areas. Points are weighted more heavily for harvested females (2 points) than for males (1 point). Using the number of observed goats from annual fall aerial surveys we apply a 6% harvest cap. Hunt areas that reach the cap are closed by emergency order during the hunting season.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During fall 1997 we completed aerial surveys in the following TCAs: K-4 Wilson Arm to Boca de Quadra, K-5 Marten Arm to Portland Canal, K-6 Southern Cleveland Peninsula, K-7 Yes Bay/Reflection Lake, K-8 Bradfield Canal to Unuk River, K-11 Walker Cove/Rudyerd Bay, K-12 Swan Lake/Mt. Reid, and K-13 Mahoney Mtn. (Table 1). We observed 551 goats in about 12 hours of flying, or 46 goats/hour. The ratio of 37 kids per 100 adults was similar to 1996 counts, and constitutes two of the highest kid ratios observed during annual surveys since 1977. This may reflect an increasing population in the unit, perhaps following declines in at least some of the TCAs (e.g. K-7).

During fall 1998 we completed aerial surveys in the following TCAs: K-4 Wilson Arm to Boca de Quadra, K-5 Marten Arm to Portland Canal, K-7 Yes Bay/Reflection Lake, K-9 Chickamin River/Lake 2722, K-10 Chickamin River to Walker Cove, K-12A Mirror Lake to

Swan Lake, K-12B Swan Lake/Mt. Reid, and K13 Deer Mtn. to Mahony Peak (Table 1). We observed 551 goats in just over 12 hours of flying. Our observation rate of 53 goats/hour was up from the previous year, and the highest rate since 1994. However, this rate is well below the overall 20-year average of 82 goats per hour.

We observed a notable increase in the number of goats in TCA K-12A where we also counted our highest kid to adult ratio for that area. K-13. This is one of the 2 areas where goats were introduced which also had a high kid to adult ratio, indicating good recruitment (Table 2). It appears that the translocated populations are continuing to grow. TCA K-11 had the lowest count since 1993 and no kids were noted during the 1997 survey. TCA K-8 was counted for the first time ever during 1997. Kids may easily be missed during surveys and the count numbers likely represent only a portion of the total young of the year. We believe goat populations elsewhere in the subunit remained relatively stable during this report period.

Population Size

We developed population estimates for goats inhabiting Unit 1A using survey data (ADF&G Unpubl. rep., 1990, Ketchikan) and the sightability correction factor developed by Smith and Bovee (1984). To derive our estimate, we first delineated the percentage of each Wildlife Analysis Area (WAA) that we believed contained suitable goat habitat. We then applied our survey-derived estimate of 1.27 goats/mi^2 to these percentages, which resulted in a mainland estimate of 7,300–10,200 goats (ADF&G Unpubl. rep., 1990, Ketchikan). In the absence of any new information, we believe this estimate is as good now as it was when it was developed.

Population Composition

The 1997 and 1998 surveys resulted in an overall productivity estimate for Unit 1A of 37 and 40 kids per 100 adults respectively, higher than the previous 2 years (Table 1). The 1997 overall subunit productivity estimate increased to a 20-year high of 37 kids per 100 adults and during 1998 the overall ratio was even higher at 40 to 100 (Table 2). Productivity varied among TCAs from 0–44 kids per 100 adults. The higher ratio of kids may be a result of more time spent flying surveys during the past 2 years. During the 1997 survey a total of 12 hours was spent searching for and counting goats, which is the most intense survey effort since surveys were began in 1968. The 29-year aerial survey average is 6.4 hours spent counting goats in Unit 1A. The amount of time spent flying surveys any given year is dependent on pilot availability, weather, and budget constraints.

Distribution and Movements

Radio collars from the previous translocations in Unit 1A are no longer transmitting and no new goats have been captured to provide new movement or distribution data.

MORTALITY

Harvest

The highest harvest during the past 11 seasons occurred in 1997 when 17 billies and 19 nannies were reported killed by 95 hunters (Table 3). The harvest of 13 goats during August of 1997 was the highest number of goats taken during that month since 1989. Unusually mild

weather may have contributed to better access and visibility of goats during the early part of the season. During 1998, 114 hunters harvested 20 billies and 13 nannies.

The Swan Lake goat harvest on Revillagigedo Island has remained low since its inception in 1993. Rugged terrain and poor access are believed to be responsible for the low harvest. Two nannies were harvested in 1997 and in 1998, 3 billies and 2 nannies were harvested for a two-year total of 7.

Season and Bag Limit	Resident and nonresident hunters
Unit 1(A), Revillagigedo Island, except that portion west of Carroll Inlet and Creek, west of the divide between Carroll Creek and the south fork of Orchard Creek, south of Orchard Creek, Orchard Lake, Shrimp Bay, and Gedney Pass.	Aug. 1–Dec. 31
One goat by registration permit only.	Aug. 1–Dec. 31
Remainder of Unit 1(A).	
Two goats by registration permit only.	

Board of Game Actions and Emergency Orders. No Board of Game actions or emergency orders were initiated during this report period.

Hunter Harvest. Five hunters killed 2 goats each in 1997 and 4 hunters killed 2 each during the 1998 season (Table 3). One hundred seventy-seven and 205 permits were issued for Unit 1A during 1997 and 1998, respectively. Of these, 95 permittees actually hunted during 1997 and 114 hunted during 1998.

Permit Hunts. Goat hunting in Unit 1A has been regulated through registration permits for the past 17 years. During 1982–1993, we issued second permits to hunters who killed a goat and returned their first permit hunt report. Just prior to the 1994 season this was changed so that hunters can now harvest up to 2 goats during a single hunt in most of the subunit. Hunters that kill 2 goats during the same year are treated as separate hunters. During the 1997 season 5 hunters killed 2 goats each, and during the 1998 season 4 hunters each killed 2 goats. Thus, 31 hunters killed 36 goats in 1997 and 29 hunters killed 33 goats during the 1998 season.

Hunter Residency and Success. Hunters from all residency categories harvested a record 36 goats from Unit 1A in 1997, the most goats harvested since 1986. Two nonresidents hunted

goats successfully in Unit 1A during 1997, and 4 nonresidents killed goats during 1998 (Table 4). Sixty-seven and 64% of the 1997 and 1998 harvests, respectively, were by hunters residing within the subunit. Nonlocal residents also killed 10 goats during the 1997 season, which is the highest nonlocal harvest since 1986. Overall hunter success during 1997 was 41% and in 1998 was 38% (Table 4).

Harvest Chronology. Unlike the past several years where the majority of goat harvests have occurred during September, the 1997 harvest was split between August and September with 13 goats taken during each month (Table 5). During the past 2 seasons 18 goats were harvested from the subunit during October, 4 in November, and 1 during December.

Transport Methods. Airplanes accounted for 88% and 82% of the transportation used by hunters during the past two seasons (Table 6). Airplanes accounted for 70–88% of the transportation used by hunters during the past 5 seasons. The balance of Unit 1A hunters used boats to access hunting areas. Many alpine lakes in this area make it possible for hunters to land in floatplanes and begin their hunt above timberline and near goat habitat.

Other Mortality

Cyclic and unpredictable weather severity and healthy predator populations, including black and brown bears and wolves, are believed to be more influential than hunting in modifying the subunit's goat populations. Bears likely kill young or very old goats during a portion of the year, while wolves are capable of preying on all age classes of animals during the entire year. When deep snows displace goats from the alpine and subalpine areas they are more vulnerable to predation as they seek refuge at lower elevations in old growth timber where food and escape habitat is much more limited. Deer numbers are low throughout most of Unit 1A leaving goats as the primary prey for wolves. Avalanches account for some goat mortality during years of heavy snowfall.

CONCLUSIONS AND RECOMMENDATIONS

Mountain goat populations appear to have remained stable throughout most of Unit 1A during this report period. Our objective of maintaining goat densities greater than 20 goats per hour of survey time has consistently been met. Low counts around Yes Bay/Reflection Lake on the northern Cleveland Peninsula during the past few years probably have been caused by declines associated with predation and over-browsing. High productivity observed during recent surveys suggests that the population in this area may be slowly rebounding.

As a result of State legislation that took effect in 1989, all nonresident goat hunters are required to be accompanied by a registered guide or by an Alaska resident over 19 years of age who is within the second degree of kindred. This law has markedly reduced nonresident participation in the unit's goat hunting. However, at least 3 registered guides have established guide use areas within the unit, and we anticipate increased nonresident hunter participation. There has also been a recent marked increase in successful nonlocal hunters. During 1998, 10 nonlocal hunters were successful, which is the highest nonlocal success in Unit 1A since 1986.

The 1991 Upper Mahoney Lake goat introduction appears to have been a success. Although 3 of the originally translocated goats are known to have died, productivity remains high and the herd is known to have increased from the original 15 to a minimum of 39 goats in fall 1996. We have established a trend count area in the vicinity of Deer Mountain/Upper Mahoney Lake (K-13), which we will periodically survey along with the other TCAs in the unit. An incomplete survey during fall 1999 revealed this population is still increasing.

More time was spent conducting aerial surveys and counting goats in Unit 1A during 1997 than in any year since aerial surveys were initiated in 1968. It is not clear whether high kid to adult ratios and higher total goat counts are simply a reflection of more intense surveys, or if there has been an increase in recruitment and/or survival. Both the 1997 and the 1998 counts had a higher goats/hour rate than the previous 2 years, although the higher goats/hour rate of 58 during 1997 remains well below the 20-year average of 82 goats per hour. We will be monitoring the population to determine the overall trend during subsequent surveys.

LITERATURE CITED

LARSEN, D. N. 1996. Mountain goat survey-inventory management report. Pages 1–13 *in* M. V. Hicks, ed. Mountain Goat. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Manage. Rep. Grants W-24-2, W-24-3. Study 12.0. Juneau. 152pp.

SMITH, C. A. 1984. Evaluation and management implications of long-term trends in coastal mountain goat populations in southeast Alaska. Pages 395–424 *in* Proc. Fourth Bien. Symp. of North Wild Sheep and Goat Counc. M. Hoefs, ed. Whitehorse, Canada.

——— AND L. NICHOLS, JR. 1984. Mountain goat transplants in Alaska: Restocking depleted herds and mitigating mining impacts. Pages 467–480 *in* Proc. Fourth Bien. Symp. of North. Wild Sheep and Goat Counc. M. Hoefs, ed. Whitehorse, Canada.

——— AND K. T. BOVEE. 1984. A mark-recapture census and density estimate for a coastal mountain goat population. Pages 487–498 *in* Proc. Fourth Bien. Symp. of North. Wild Sheep and Goat Counc. M. Hoefs, ed. Whitehorse, Canada.

PREPARED BY:

Boyd Porter
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 1A mountain goat survey data, 1968–1998

Survey dates[a]	Nr of kids	Nr of adults	Total goats	Kids-100 adults	Count time (hrs.)	Goats/hour
Aug. 20–Sep. 18, 1968	162	553	715	29	4.9	146
Sep. 1–Sep. 16, 1971	111	357	468	31	3.9	120
Aug. 16 – Sep. 16, 1973	35	149	184	23	2.5	74
Aug. 27 – Sep. 21, 1974	14	50	64	28	1.8	35
Aug. 12 – Sep. 11, 1975	84	270	354	31	7.6	46
Sep. 1 – Sep. 11, 1976	73	283	356	26	8.0	44
Aug. 31 – Sep. 6, 1977	165	354	519	47	6.3	82
Sep. 5 – Sep. 9, 1978	126	404	530	31	5.2	102
Sep. 18 – Sep. 21, 1979	62	238	300	26	3.8	79
Aug. 20 – Sep. 12, 1980	215	617	832	35	9.6	87
Aug. 26 – Sep. 21, 1981	153	461	614	33	6.0	102
Aug. 29 – Sep. 18, 1982	167	515	682	32	6.9	99
Aug. 30 – Sep. 23, 1983	177	658	835	27	7.5	111
Sep. 5 – Sep. 24, 1984	174	666	840	26	7.1	118
Sep. 9 – Sep. 26, 1985	75	311	386	24	3.3	117
Sep. 12 – Sep. 15, 1986	64	359	423	18	4.0	106
Sep. 23 – Oct. 8, 1987	39	182	221	21	2.0	110
Sep. 3 – Sep. 19, 1988	104	304	408	34	4.4	93
Sep. 10 – Sep. 13, 1989	124	415	539	30	5.5	98
Sep. 6 – Oct. 3, 1990	193	603	796	32	9.3	85
Aug. 30 – Sep. 5, 1993	47	163	210	29	6.8	31
Sep. 8 – Oct. 1, 1994[b]	81	414	495	19	8.8	56
Aug. 28 – Sep. 4, 1995	55	290	345	19	8.7	40
Sep. 3 – Sep. 30, 1996	112	309	421	36	10.6	40
Sep. 9 – Sep. 29, 1997	147	551	698	37	12.0	46
Sep. 13 – Sep. 21, 1998	102	450	552	40	10.4	53

[a]Most comparable data is from 1975–1994.

[b]Includes a 48 minute survey of the Deer Mountain/Upper Mahoney Lake translocated population on September 8. Fourteen adults and 4 kids were observed.

Table 2 Unit 1A mountain goat trend count area surveys, 1980–1998

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-3	1999	114	13	127	1.5	85	9	0
	1995	105	28	133	2.0	66	26	0
	1982	26	10	36	0.5	72	38	3
	1980	42	11	53	1.5	35	26	0
K-4	1999	29	6	35	.9	38	21	0
	1998	65	17	82	1.2	68	26	1
	1997	78	24	102	1.1	93	31	1
	1994	49	10	59	1.1	54	20	0
	1993	21	6	27	0.6	45	28	0
	1990	71	26	97	0.9	108	37	3
	1989	59	19	78	0.9	87	32	1
	1988	17	4	21	0.7	30	24	0
	1987	69	17	86	0.8	107	25	0
	1985	24	3	27	0.9	30	13	0
	1984	76	22	98	0.9	109	29	2
	1983	88	26	114	1.1	104	30	5
	1982	64	23	87	1.0	87	36	0
	1981	68	27	95	0.8	119	40	4
	1980	35	18	53	0.7	76	51	1
K-5	1999	149	16	165	1.3	127	11	2
	1998	158	36	194	2.0	97	23	3
	1997	283	71	354	1.9	186	25	2
	1994	189	40	229	2.5	92	21	1
	1990	153	46	199	2.0	99	30	2
	1989	59	19	78	0.9	87	32	1
	1988	93	29	122	1.3	94	31	0
	1986	148	24	172	1.2	143	16	1
	1985	99	21	120	1.0	120	21	0
	1984	153	46	199	1.5	133	30	1
	1983	173	47	220	2.0	110	27	2
	1982	118	48	166	1.6	104	41	5
	1981	145	47	192	1.8	107	32	5
	1980	116	35	151	2.1	72	30	4

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-6	1997	18	7	25	1.7	15	39	0
	1996	18	6	24	1.5	16	33	0
K-7	1999	46	12	58	1.9	31	26	0
	1998	43	6	49	2.0	25	14	0
	1997	49	12	61	2.3	26	24	0
	1996	65	25	90	2.5	36	38	1
	1995	22	2	24	2.2	11	9	0
	1994	82	12	94	2.6	36	15	0
	1993[a]	68	18	86	2.5	34	26	0
	1990	166	62	228	2.0	114	37	2
	1984	117	30	147	1.8	82	26	0
	1983	131	37	168	1.8	93	28	1
	1980	128	36	164	1.8	91	28	2
K-8	1997	46	15	61	2.2	28	33	0
	1982[b]	52	13	65	0.7	89	25	0
K-9	1999	29	3	32	1.5	21	10	0
	1998	17	4	21	1.9	11	24	0
	1996	44	12	56	1.7	33	27	0
	1995	47	6	53	1.7	31	13	0
	1993[a]	48	20	68	2.2	31	42	1
	1990	81	22	103	1.5	69	27	1
	1989	94	33	127	1.4	91	35	2
	1988	119	46	165	1.3	127	39	1
	1986	106	21	127	1.4	91	20	0
	1985	92	24	116	1.1	105	26	1
	1984	138	19	157	1.4	112	14	0
	1983	146	37	183	1.6	114	25	0
	1982	104	25	129	1.3	99	24	0
	1981	100	39	139	1.8	77	39	4
	1980	158	66	224	1.8	124	42	4

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-10	1998	20	3	23	1.1	21	15	0
	1996	52	14	66	1.2	55	27	0
	1994	63	10	73	1.4	52	16	0
	1993[a]	21	3	24	1.2	20	14	0
	1990	86	22	108	0.9	120	26	2
	1989	66	13	79	1.1	72	20	0
	1988	70	23	93	0.9	103	33	0
	1987	92	18	100	1.0	100	20	0
	1986	75	12	87	1.1	79	16	0
	1985	120	30	150	1.1	136	25	2
	1984	150	47	197	1.2	164	31	2
	1983	88	26	114	1.0	114	30	5
	1982	99	26	125	1.2	104	26	2
	1981	119	33	152	1.2	127	28	1
	1980	116	42	158	1.5	105	36	4
K-11	1997	6	0	6	0.3	20	0	0
	1996	12	2	14	0.3	47	17	0
	1995	20	2	22	0.3	73	10	1
	1994	17	5	22	0.4	55	29	1
	1993[a]	5	0	5	0.2	25	0	0
	1990	15	2	17	0.3	57	13	0
	1989	21	4	25	0.4	62	19	0
	1987	21	4	25	0.3	83	19	0
	1986	30	7	37	0.3	123	23	0
	1984	32	10	42	0.4	105	31	1
	1982	20	8	28	0.2	140	40	0
	1981	29	7	36	0.3	120	24	0
	1980	22	7	29	0.3	97	32	1
K-12A	1998	39	27	12	0.5	78	44	1
	1996	23	18	5	0.8	31	28	0
	1995	36	32	4	0.7	51	12	0
	1992	34	27	7	0.4	79	26	0
K-12B	1998[b]	74	62	12	1.3	57	19	0
	1996	109	74	35	1.6	68	47	6

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	1995	77	64	13	1.8	43	20	1
	1992	50	35	15	1.5	33	43	3
	1991	25	18	7	--	--	39	--
	1990	29	20	9	1.1	26	45	2
	1988	43	29	14	1.2	36	33	2
K-13[e]	1998	59	46	13	0.8	79	28	1
	1997	48	35	13	1.1	44	37	1
	1996	39	26	13	1.0	39	50	0
	1994	18	14	4	0.8	23	28	0

[a] Extended hot weather suspected of keeping goats in low-elevation shade.
[b] Incomplete survey.
[c] Swan Lake translocated population.
[d] Surveys were done using a Bell 206 Jet Ranger helicopter.
[e] Upper Mahoney Lake translocated population.

Table 3 Unit 1A mountain goat harvest data for permit Hunt RG001/002, 1985–1998

Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	Male	Female	Total
1985	261	122	88	51	29	22	51
1986	244	122	71	51	16	33	51
1987	195	107	61	27	14	3	27
1988	201	87	66	33	14	19	33
1989	182	87	56	23	14	9	23
1990	208	90	81	20	14	6	20
1991	245[b]	128	80	16	10	5	16[c]
1992	246	120	76	23	17	6	23
1993	299	197	52	33	20	13	33
1994[d]	215	135	55	20[e]	11	9	20
1995	201	110	54	24[f]	14	10	24
1996	171	91	48	22	14	8	22
1997	177	82	51	36[g]	17	19	36
1998	205[h]	91	65	33[i]	20	13	33

[a] Total permits issued does not include the Unit 1B portion of the hunt and exceeds the total for Did not hunt, Unsuccessful hunters, and Successful hunters.
[b] Three permits not returned.
[c] The sex of 1 goat was not reported.
[d] Regulation changed; hunters could take 2 goats during a single hunt.
[e] Two hunters killed two goats (18 hunters killed 20 goats).
[f] One hunter killed two goats (23 hunters killed 24 goats).
[g] Five hunters killed two goats (31 hunters killed 36 goats).
[h] One permit not returned.
[i] Four hunters killed two goats (29 hunters killed 33 goats).

Table 4 Unit 1A mountain goat hunter residency and success, 1985–1998

	Successful				Unsuccessful			
Year	Local res[a]	Nonlocal res	Nonres	Total	Local res[a]	Nonlocal res	Nonres	Total
1985		30	21	51		67	21	88
1986		39	12	51		48	23	71
1987	15	0	12	27	44	3	14	1
1988	19	0	14	33	35	0	31	66
1989	18	4	1	23	45	10	61	56
1990	17	3	0	20	75	6	0	81
1991	15	1	0	16	73	7	0	80
1992	17	5	1	23	67	8	1	76
1993	29	4	0	33	50	2	0	52
1994	15	3	2	20	45	9	1	55
1995	18	6	0	24	38	14	2	54
1996	14	8	0	22	30	15	3	48
1997	24	10	2	36	40	8	3	51
1998	21	8	4	33	51	10	4	65

[a] Local and nonlocal residents combined during 1985 and 1986. Local resident hunters reside in Unit 1A.

Table 5 Unit 1A goat harvest chronology, 1985–1998

Year	Aug	Sep	Oct	Nov	Dec
1985	14	49	29	0	8
1986	16	59	8	2	16
1987	33	30	22	7	7
1988	24	58	15	3	0
1989	17	30	17	13	22
1990	9	8	2	1	0
1991	5	3	4	1	3
1992	7	6	6	4	0
1993	5	15	9	0	4
1994	1	13	6	0	0
1995	3	19	2	0	0
1996	5	15	2	0	0
1997	13	13	7	3	0
1998	8	12	11	1	1
Totals	160	330	140	35	61

Table 6 Unit 1A successful mountain goat hunters' transportation methods, 1985–1998

Year	% Using airplanes	% Using boats
1985	90	10
1986	82	18
1987	64	36
1988	85	15
1989	48	52
1990	53	47
1991	49	51
1992	87	13
1993	70	30
1994	70	30
1995	88	12
1996	82	18
1997	83	17
1998	73	27

LOCATION

GAME MANAGEMENT UNIT: 1B (3,000 mi^2)

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland, Cape Fanshaw to Lemesurier Point

BACKGROUND

Mountain goats are indigenous to Unit 1B, and distributed throughout appropriate habitat. Goats reside in alpine and subalpine areas from spring until fall. During winter goats use windblown or steep slopes with little snow cover and retreat to timbered areas during severe weather, often descending to coastal shorelines. Although data is scarce, available information indicates Unit 1B goat populations have been stable with the exception of the late 1960s and early 1970s, when severe winters reduced the herd.

Hunters have limited access to goat habitat so hunting pressure is focused near access points. Because of this ADF&G biologists monitor harvest closely. The kill has ranged from 20–36 goats in the last 6 years.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES:

Preliminary management goals are to maintain population levels to accommodate an annual harvest of 35 goats and a 35% hunter success rate.

METHODS

Aerial surveys were flown within established trend count areas to obtain the number of goats and the proportion of kids in the population. We monitored hunter harvest through a registration permit system. All permit holders were required to report and those hunting reported the location and duration of the hunt, transportation used, and date and sex of kill. We recorded anecdotal information from hunters and guides.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Data are insufficient to determine precise population trends in Unit 1B. The population appears stable.

Population Composition

Table 1 shows the past 6 years of age composition data from aerial trend counts. Differences in sample size occur because of inclement weather, which makes complete surveys difficult. In the September 1997 survey, kids composed 13% of the goats classified, a decrease from the September 1996 survey that had 26% kids. Annual differences in survey intensity (i.e., minutes/mile search time) and methods, as well as lack of information about seasonal goat movements, make it difficult to estimate goat abundance.

Habitat

In September 1998 Fish and Game and U. S. Forest Service biologists' inspected the ridge between Dahlgren and Jamestown peaks for signs of goat use. No obvious goat sign was found on the ridge, where the US Forest Service has proposed building a logging road.

MORTALITY

Harvest

Season and Bag Limit:	Resident and nonresident hunters:
Unit 1B, that portion north of the Bradfield Canal and the north fork of the Bradfield River.	Aug. 1–Dec. 31.
One goat by registration permit only.	
Remainder of Unit 1B.	Aug. 1–Dec. 31.
Two goats by registration permit only.	

Board of Game Actions and Emergency Orders. The Federal Subsistence Board made a determination that all rural residents of Units 1B and 3 qualify as subsistence users of goats in Unit 1B. This action became effective July 1, 1997. No previous determination had been made, except that no subsistence use was allowed by residents of Petersburg, Kupreanof, and outlying areas.

Hunter Harvest. The 1997 and 1998 harvests of 33 and 20 goats, respectively, for Unit 1B was below our management harvest goal of 35 goats (Table 2). Hunter success was 42% in 1997 and 33% in 1998, which approaches the management goal of 35%. Males comprised 79% and 80% of the harvest for 1997 and 1998, respectively. This data from registration hunt reports was not verified by checking hunter kills. We distributed literature designed to help hunters identify male goats and we encouraged hunters to select males.

Two subsistence hunters received a Federal permit to harvest a second goat in 1997 in the RG004 area. One of these hunters successfully harvested a male goat. In 1998, no Federal permits were issued. Federal regulations require a state permit for a first goat and a federal permit to take a second goat.

Hunter Residency and Success. Petersburg and Wrangell residents continue to be the dominant group of hunters and harvest the largest number of goats (Table 3). The number of unsuccessful local residents exceeds the number of unsuccessful nonlocal residents and nonresidents. This discrepancy is not due to different hunting skills between the groups, but due to the lack of effort by many locals. Many local hunters primarily hunt the beach hoping for an easy opportunity to harvest a goat.

Harvest Chronology. Most of the Unit 1B goat harvest takes place in August (Table 4). This was especially true in 1997 when 16 of the 33 goats (48%) were harvested in August.

Transport Methods. In 1997 and 1998, 67% and 55%, respectively, of successful hunters accessed their hunting area by boat; the remainder used airplanes (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

Goat populations seem stable in Unit 1B. Hunting pressure is low and limited to areas of easy access. The population should be monitored closely during the upcoming year. I recommend no change in regulations.

PREPARED BY:
Edward B. Crain
Wildlife Biologist III

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1 Unit 1B summer aerial mountain goat composition counts, 1991–98

Regulatory year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
1991/92	67	(83)	14	(17)	0	21	81	35
1992/93	117	(70)	50	(30)	0	43	167	72
1994/95 (Aug. 1994)	90	(74)	31	(26)	0	34	121	35
1994/95 (June 1995)	339	(94)	21	(6)	0	16	360	32
1996/97 (Sept. 1996)	59	(74)	21	(26)	0	36	80	52
1997/98 (Sept. 1997)	144	(87)	21	(13)	0	15	165	73
1998/99 (no surveys)								

[a] Different portions of area flown in different years; data not directly comparable.

Table 2 Unit 1B mountain goat harvest data by permit hunt, 1993–98

Hunt No.	egulatory year	Permits [a] issued	Number hunted	(%) Did not hunt	Number of successful hunters	(%) successful hunters	Nr. males	(%) males	No. Females	Total Harvest
RG001	1993/94		18		11	(61)	5	(45)	6	11
	1994/95		6		6	(100)	1	(17)	5	6
	1995/96		11		6	(54)	3	(50)	3	6
	1996/97		10		1	(10)	0	(0)	1	1
	1997/98		8		5	(63)	5	(100)	0	5
	1998/99		15		4	(27)	3	(75)	1	4
RG004	1993/94	147	66	(55)	25	(38)	19	(76)	6	25
	1994/95	144	80	(44)	28	(35)	19	(68)	9	28
	1995/96	125	59	(52)	22	(40)	20	(90)	2	22
	1996/97	147	60	(59)	21	(35)	15	(71)	6	21
	1997/98	156	70	(55)	28	(40)	21	(75)	7	28
	1998/99	119	45	(62)	16	(36)	13	(81)	3	16
Combined	1993/94		84		36	(43)	24	(67)	12	36
	1994/95		86		34	(40)	20	(59)	14	34
	1995/96		70		28	(40)	23	(82)	5	28
	1996/97		80		22	(31)	15	(68)	7	22
	1997/98		78		33	(42)	26	(79)	7	33
	1998/99		60		20	(33)	16	(80)	4	20

[a] Number of permits issued for 1B in hunt number RG001 is unknown because it includes 1A.

Table 3 Unit 1B mountain goat hunter residency and success, 1993–98

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total Hunters
1993/94	18	16	2	36	(44)	32	13	1	46	(56)	82
1994/95	21	7	6	34	(40)	35	5	10	50	(60)	84
1995/96	10	9	9	28	(42)	27	8	3	38	(58)	66
1996/97	8	7	7	22	(32)	27	12	6	45	(67)	67
1997/98	20	8	5	33	(42)	30	10	5	45	(58)	78
1998/99	9	5	6	20	(33)	31	7	2	40	(67)	60

[a] Residents of Petersburg, Wrangell, and Kake.

Table 4 Unit 1B mountain goat harvest chronology, percent by time period, 1993–98

	Harvest Periods										
Regulatory	August		September		October		November		December		Total
year	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	Harvest
1993/94	9	(25)	15	(41)	9	(25)	1	(3)	2	(6)	36
1994/95	11	(32)	8	(24)	8	(24)	2	(6)	5	(15)	34
1995/96	7	(25)	12	(43)	5	(18)	2	(7)	2	(7)	28
1996/97	10	(45)	6	(27)	3	(13)	2	(9)	1	(6)	22
1997/98	16	(49)	5	(15)	5	(15)	4	(12)	3	(9)	33
1998/99	6	(30)	1	(5)	5	(25)	5	(25)	3	(15)	20

Table 5 Unit 1B mountain goat harvest, percent by transport methods, 1993–98

Regulatory year	Percent of Harvest						
	Airplane		Boat		Other		Total harvest
	n	(%)	n	(%)	n	(%)	
1993/94	20	(56)	16	(44)	0	(0)	36
1994/95	22	(65)	12	(35)	0	(0)	34
1995/96	21	(75)	7	(25)	0	(0)	28
1996/97	12	(54)	9	(40)	1	(6)	22
1997/98	11	(33)	22	(67)	0	(0)	33
1998/99	9	(45)	11	(55)	0	(0)	20

LOCATION

GAME MANAGEMENT UNIT: 1C (7600 miles^2)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay

BACKGROUND

Mountain goats arrived in Southeast Alaska from southern refugia sometime after the retreat of Pleistocene glaciation (Chadwick, 1983). Because mountain goats utilize alpine and subalpine zones in the summer and the upper reaches of coniferous forests in the winter, the coastal mountains of British Columbia and Alaska have promoted range expansion rather than acted as a barrier. Mountain goats now inhabit most of the coastal range of Southeast Alaska where steep forested slopes broken by rock outcrops are common.

Because they are a popular species for local hunters and trophy hunters from around the world, mountain goat populations in easily accessible areas near Juneau have been reduced from historic levels. In the immediate Juneau vicinity goat populations may have been reduced significantly early in the 1900s as mining activity increased. Sport hunting of the populations likely contributed to further declines. Low goat numbers prompted the Board of Game's decision to close the area between the Taku Glacier and Eagle Glacier/River to hunting in 1985. To boost local goat numbers, mountain goats from the Whiting River were reintroduced to Mount Juneau in the summer of 1989. All of these goats, individually marked prior to reintroduction, apparently left the area by 1992, but small numbers of mountain goats are routinely sighted both on Mt. Juneau and on Heintzelman Ridge above urban Juneau. Aerial surveys of nearby Mt. Hawthorne have revealed increasing goat numbers. Goat sightings are also routinely reported from Sheep Mountain, Mt. Bullard, and Mt. McGinnis.

Guided hunts in Tracy and Endicott arms have become a major factor in the Unit 1C goat harvest. This is one of few areas in the world where hunters may stay in comfort aboard large boats and make day hunts for goats along steep cliffs lining fiords. This use predominates late in the season, when snow often forces goats to lower elevations. The area south of the Endicott River in the Chilkat Range was reopened to hunting by a BOG action in fall of 1996 offering hunters more opportunities to harvest a goat.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population management objectives identified by staff for Unit 1C are as follows:

1. Maintain goat densities so at least 30 goats per hour are seen during fall surveys from Eagle River/Glacier to the Antler River and in the Chilkat Range;

2. Maintain goat densities so at least 50 goats per hour are seen during fall surveys south of Taku Inlet.

METHODS

Harvest data were obtained from registration permit hunt reports for the 1997 and 1998 fall hunts. Population surveys were conducted in a small portion of Unit 1C during the report period using both a fixed and rotor winged aircraft.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Information on Unit 1C mountain goat populations was gathered from aerial surveys and hunters' comments. Mountain goat populations seem to be at medium densities over most of the hunted range, based on the number of goats per hour seen during aerial surveys (Table 1). Aerial population surveys were conducted from Pt. Salisbury to the Taku Glacier, as well as from Eagle Glacier to the Lace River during this report period. Sighting rates and the ratio of kids to adults were both within the range of previous surveys (Table 1). In areas that were not surveyed during this report period, we used hunter effort and success as well as previous survey information as an indicator of population status. The goat population on the mountains adjacent to Juneau appears to be increasing, and sightings are becoming routine above town.

The Board of Game adopted a proposal in fall 1998 to allow bow and arrow hunting of mountain goats between Pt. Salisbury and the Taku Glacier. Goat numbers in this area have reached huntable levels (>100 animals) for the first time since the area closed in 1985.

No sign of contagious ecthyma (orf) has been seen during the report period, although any facial lesion tends to be attributed to the disease by hunters.

MORTALITY

Harvest

Season and Bag Limits:	Resident and nonresident hunters
Unit 1C, that portion draining into Lynn Canal and Stephens Passage between the Antler River and Eagle Glacier and River, and all drainages of the Chilkat Range south of the south bank of the Endicott River.	Oct. 1–Nov. 30.

1 goat by registration

permit only.

Unit 1C, that portion draining into Stephens Passage between Eagle Glacier and River and Point Salisbury	No open season.
Remainder of Unit 1C	Aug 1–Nov 30.
1 goat by registration permit only.	

Board of Game Actions and Emergency Orders. At its fall 1998 meeting the Board of Game heard and approved a proposal to reopen goat hunting from Pt. Salisbury to the Taku Glacier. This area had been closed since the 1985 season because of low goat numbers.

Hunter Harvest. A total of 84 goats were taken during this report period, 46 in 1997 and 38 in 1998 (Table 2). Average harvest during the reporting period increased by 8 goats over the preceding 2-year period. Males again made up a large part of the harvest (71%), which is similar to the 73% male harvest during the previous report period. The predominantly male harvest may partially result from the high number of guided hunts within the area. Registered guides are aware that females are counted more heavily than males against harvest guidelines, and that it is in their interest to restrict their hunters to taking billies. Most guided hunters prefer a male goat because of its trophy status. Because we do not require hunters to present their goats to ADF&G staff, the reported harvest of male goats may be inflated as hunters are sometimes reluctant to admit to killing a nanny.

Permit Hunts. Registration Permit Hunts RG012 and RG013 are incorporated under a single permit. The number of permits issued increased from a mean of 141 in the previous report period, to a mean of 159 in 1997/98. (Table 3). Compliance with reporting requirements has been good, but we continue to resort to reminder letters and certified reminder letters to get information from some hunters.

Hunter Residency and Success. The success rate of all hunters averaged 57% during this report period compared to 53% during 1995–96. Although local resident hunters outnumbered non-resident hunters more than 2:1, nonresidents harvested an equal number of goats (Table 4). The percentage of goats taken by nonresidents declined slightly from the previous report period, but the number of goats harvested by non-residents increased from 38 to 39. This reflects a growing popularity in goat hunting by local residents. Successful hunters expended an average of 2.2 days per goat during the reporting period, an effort level below the mean of 3.2 days per goat during 1995–96 (Table 3). Unsuccessful hunters expended an average of 3.0 days in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4 month season accounting for 37% of the take in 1997 and 55% in 1998. The preponderance of late season kills reflects the availability of goats at lower elevations and hunter desire to take an animal in winter pelage.

Transport Methods. Boats have historically been the primary means of transportation for successful hunters. This trend continued during the report period, with 79% of successful hunters using them (Table 5). Other means of transportation included airplanes, highway vehicles, and walking. Highway vehicles were used along the Juneau road system, and the person walking lived in Snettisham.

Commercial Services. The use of commercial services remained about the same as last report period with 44% of hunters using a commercial service versus 43% during 1995–96. Commercial transportation to the field was used by 27% of the hunters using a commercial service. This is not surprising since most huntable areas are only accessible by airplane or boat. The commercial service used most often by resident hunters was transportation, whereas all nonresidents used a registered guide as required by law.

Other Mortality

There is little data available concerning natural mortality. Holroyd (1967) cited several instances of goats killed in falls, rockslides, and avalanches. Several radio-collared goats from a previous study near Juneau died in circumstances that may have involved accidents, although abundant wolf sign at carcass locations made determination of the cause of death problematic. Wounding loss may be responsible for additional deaths, but we are unable to gather data related to this cause.

HABITAT

Assessment

Winter and summer goat range within Unit 1C is extensive and goat numbers are probably below carrying capacity in most parts of the subunit. Helicopter traffic in or near goat habitat is probably the biggest concern at this time. There is a steady increase in demand for both summer flightseeing tours as well as winter heliskiing opportunities. Little is known about the effects of helicopter noise on goat populations. Goats may be displaced from preferred habitat areas because of these disturbances that could ultimately play a role in population declines due to reduced fitness. Because of these concerns, the USFS and ADF&G have been discussing methods of addressing these concerns through a study funded by the USFS, but with input by ADF&G staff.

CONCLUSIONS AND RECOMMENDATIONS

Because aerial surveys were not completed in the southern part of the subunit or in the Chilkat Range during the report period, it is unknown if management objectives regarding goat densities were met. Between the Eagle Glacier and River and the Antler River goat densities were greater than twice the management objectives. Hunter effort and success throughout the unit was greater than the preceding report period. In both years hunters killed predominantly males.

As weather and funding permit, aerial surveys should be conducted to determine population trends. It is not clear if goats reintroduced to Mt. Juneau have contributed to population expansion, but goat numbers near Juneau have apparently increased. Survey results from the previous management report indicate a recovery in goat numbers in the Chilkat Range, and a proposal to reauthorize hunting in that area was approved by the Board of Game in fall 1998.

Easily accessed areas such as Tracy and Endicott Arms are receiving heavier hunting pressure than the rest of the subunit. For this reason fine scale management of goat populations through harvest guidelines for hunt subareas is being used for northern Southeast Alaska. This allows us to monitor harvest pressure in discrete areas within permit hunt boundaries. To minimize the amount of paper carried by hunters, we will continue to administer hunts in Unit 1C under one permit. This does not jeopardize our ability to track harvest from discrete locations in-season.

Although the percentage of nannies in the kill was low during the report period, continued emphasis should be placed on directing hunting pressure away from females. Harvest guidelines established for each permit hunt area will continue to be used and should further encourage hunters to select for males.

The Chilkat Range south of the Endicott River, reopened in fall 1998, received little hunting pressure and no goats were harvested there during this report period. The season opening date of October 1 in this area may be restrictive to local hunters due to deteriorating weather late in the year. If this lack of effort continues we may propose to the BOG to open the season at an earlier date to increase hunter effort.

LITERATURE CITED

HOLROYD, J. C. 1967. Observations of rocky mountain goats on Mount Wardle, Kootenay National Park, British Columbia. Can. Field-Nat. 81:1-22.

PREPARED BY:
Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1 Unit 1C mountain goat composition counts, 1986–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	Percent kids	Goats per hour
1986	192	55	247	29	22	42
1987			No survey			
1988	81	26	107	32	24	26
1989	514	169	683	33	25	51
1990–92			No survey			
1993[1]	171	4	175	2	2	17
	62	15	77	25	19	77
1994	370	79	449	21	18	82
1995			No survey			
1996[2]	215	78	293	36	27	52
1997			No survey			
1998[3]	225	38	263	20	14	77
	71	19	90	27	21	39

1 The first survey was conducted from a boat in early May at Tracy and Endicott arms. The second survey, conducted from a PA-18 aircraft in October, was done in the Kensington Mine area.

2 Survey included all goat habitat in the Chilkat Range outside of Glacier Bay National Park, from Sullivan Is. to the southern end of the Chilkat Mts.

3 The first survey was from Eagle River and Glacier to the Lace River. The second survey was from Pt. Salisbury to the Taku Glacier (RG014 bow and arrow only hunt area).

Table 2 Unit 1C annual goat harvest, 1990–98

Year	Males	Females	Unknown	Total
1990	19	10	1	30
1991	14	8	0	22
1992	27	12	0	39
1993	35	12	0	47
1994	36	6	0	42
1995	25	7	0	32
1996	24	8	3	35[1]
1997	30	14	2	46
1998	30	6	2	38

1 Three of these goats were taken illegally.

Table 3 Unit 1C goat hunter effort and success, 1990–98

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
1990	140	30	82	2.7	25	57	2.5	55	139	2.7
1991	145	22	48	2.2	41	114	2.8	63	162	2.6
1992	151	39	124	3.2	35	74	2.1	74	198	2.7
1993	157	47	135	2.9	50	136	2.7	97	271	2.8
1994	168	42	114	2.7	41	132	3.2	83	246	3.0
1995	146	32	111	3.5	44	134	3.0	76	245	3.2
1996	135	35	101	2.9	21	42	2.0	56	143	2.6
1997	164	46	118	2.7	35	70	2.0	81	188	2.3
1998	153	38	85	2.2	29	88	3.0	67	173	2.6

Table 4 Unit 1C goat hunter success by community of residence, 1990–98

		Successful hunters			Unsuccessful hunters		
Year	Percent success	Unit resident	Other AK	Non resident	Unit resident	Other AK	Non resident
1990	55	16	4	10	20	4	1
1991	35	14	3	5	34	4	3
1992	53	22	5	12	27	8	0
1993	48	22	4	21	40	7	3
1994	51	16	3	23	29	7	5
1995	43	12	2	18	36	5	2
1996	63	11	4	20	18	4	0
1997	57	22	4	20	30	4	1
1998	57	17	2	19	24	3	2

Table 5 Unit 1C transport methods used by successful goat hunters, 1990–98

Year	Airplane		Boat		Foot		Hwy. vehicle		Other	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
1990	2	(7)	26	(87)	2	(7)	0	(0)	0	(0)
1991	3	(14)	19	(86)	0	(0)	0	(0)	0	(0)
1992	7	(18)	32	(82)	0	(0)	0	(0)	0	(0)
1993	7	(17	35	(85)	1	(2)	4	(10)	0	(0)
1994	9	(21)	31	(74)	0	(0)	2	(5)	0	(0)
1995	6	(19)	25	(78)	0	(0)	0	(0)	1	(3)
1996	4	(12)	26	(79)	0	(0)	3	(9)	0	(0)
1997	10	(22)	34	(74)	1	(2)	1	(2)	0	(0)
1998	6	(16)	32	(84)	0	(0)	0	(0)	0	(0)

Table 6 Commercial services used by Unit 1C goat hunters, 1991–98

Year	Unit residents		Other AK residents		Nonresidents		Total use		Registered guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1991	21	3	1	1	0	7	22	11	5	6	0
1992	38	4	6	2	2	10	46	16	7	9	0
1993	36	14	4	4	2	21	42	39	21	17	1
1994	38	4	7	1	1	27	46	33	28	4	0
1995	35	7	9	1	0	20	44	28	20	8	0
1996	20	3	5	2	0	19	25	24	20	4	0
1997	37	9	5	3	0	21	42	33	21	12	0
1998	28	5	5	0	0	21	33	26	21	4	1

LOCATION

GAME MANAGEMENT UNIT: 1D (2700 mi^2)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay

BACKGROUND

There are 3 separate registration permit hunts with separate hunt areas in Unit 1D (RG023, RG024, and RG026). There is also an area near Skagway, bounded by the Taiya River, the Yukon and White Pass Railroad, and the Canadian border that is closed to goat hunting. The Skagway area was closed by a Board of Game action in 1984 (effective during the 1985 hunting season) because of a sharp decline in goat numbers as evidenced by fewer sightings, reduced hunter success, and a greater proportion of females in the harvest. The allowable harvest was also becoming difficult to maintain, with the season closing the same day it opened. Aerial composition counts conducted between 1983 and 1995 indicated that this population had not recovered despite the closure. In the remainder of the subunit, mountain goat populations appear to be fairly healthy based on aerial survey information.

Hundertmark et. al. (1983) examined winter habitat utilization by mountain goats in the Chilkat Valley. They felt that increased access afforded by timber and mineral development would increase hunting pressure and illegal harvest. This added hunting pressure and the ability to access previously unhunted areas were considered as detrimental to goat populations as the habitat loss resulting from logging and mining.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population management objectives identified by staff for Unit 1D are as follows:

1. Skagway closed area - Increase population to 100 animals;

2. Unit 1D north of Klehini/Chilkat River and Katzehin River - Increase estimated population from 600 to 1,000 goats. Maintain hunter success of 25%;

3. Unit 1D south of Klehini/Chilkat River and Katzehin River - Increase estimated population from 300 to 500 goats. Maintain hunter success of 25%;

4. Conduct aerial surveys in areas of concentrated harvest at least every 3 years.

METHODS

Aerial surveys were conducted within the subunit during 1997 and 1998 by both ADF&G staff and Bureau of Land Management (BLM) personnel. Results from BLM surveys, though not directly comparable to ADF&G survey results due to different survey aircraft and intensity, still provide useful data. A single registration permit was used to administer hunts RG023, RG024, and RG026. Harvest parameters, including hunter effort and success rates, were determined for

each hunt. Harvest guidelines for the 3 hunt areas were revisited in fall of 1998 and adjusted for the most recent survey data available.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

With only occasional nonstandard surveys, mountain goat population status in Unit 1D is difficult to evaluate. Survey results vary from year to year for most areas (Tables 1a, 1b, and 1c). Some of these variations are due in part to the intensity and scope of the surveys in any given area. Although some differences in the survey results for identical areas are most certainly related to survey conditions, the degree to which any one survey is influenced is unknown. We will attempt to use BLM survey data in conjunction with that collected by ADF&G to arrive at a more comprehensive evaluation of the Unit 1D goat population.

Historical data suggests that hunting pressure has the potential to reduce goat numbers rapidly in easily accessible areas, such as the area north and west of Skagway that was closed in 1985 (Table 1a). Despite this closure, recovery of goats in this area has been slow. A portion of the Takshanuk Mountains in Hunt Area RG023 is similar to the Skagway closed area in that a highway borders it also, making it readily accessible to hunters. Because other areas in northern Southeast Alaska have exhibited low goat population growth rates even after several years of protection, this area merits yearly monitoring.

Population Composition

We did not attempt to conduct any unit wide population estimates during this report period, rather our surveys were meant to monitor population trends and kid to adult ratios in certain areas. Our surveys were concentrated in areas of harvest and one area where a hydro project may be initiated. Based on the overall number of goats, percent kids, and number of goats seen per hour of survey time, the goat population appears healthy (Tables 1a, 1b, and 1c).

MORTALITY

Harvest

Season and Bag Limits:	Resident and nonresident hunters
Unit 1D, that portion between Taiya Inlet/River and the White Pass and Yukon Railroad.	No open season
Unit 1D, that portion north or east of the Chilkat River and west of the Ferebee River/Glacier.	Sep 15–Nov 15
1 goat by registration permit only.	

Unit 1D, that portion south of the Klehini River/Chilkat River and that portion south of the Katzehin River.	Aug 1–Dec 31
1 goat by registration permit only.	
Remainder of Unit 1D	Sep 15–Nov 30.
1 goat by registration permit only	

Board of Game action and Emergency Orders. No Board of Game actions were taken in Unit 1D regarding mountain goat seasons or bag limits. An emergency order was issued in fall 1997 to close most of Unit 1D because harvest guidelines had been met or exceeded. In 1998 no emergency orders were issued.

Hunter Harvest. A total of 54 goats were harvested during the report period, 27 each in 1997 and 1998 (Table 2). The 1997 harvest consisted of 15 males and 12 females, compared to the 1998 harvest of 20 males, 6 females, and 1 goat of unknown sex. The harvest during both years of the report period was slightly higher than the mean annual harvest of 24 goats during 1990–1996 (Table 2).

Permit Hunts. Mountain goat hunting within Unit 1D occurred under 3 registration permit hunts during the report period. An average of 153 permits were issued during 1997–98, compared to a mean of 173 during 1995–96, and a mean of 168 since 1990. Hunt reports were amalgamated for the 3 hunts. The main reason for maintaining 3 hunts in the subunit is to allow different opening and closing dates while attempting to adjust for relative differences in hunting pressure. The area between the Taiya River and the White Pass & Yukon Railroad remained closed to hunting.

Hunter Residency and Success. A mean of 29% of goat hunters were successful during the report period (Table 4). This is much higher than the 21% mean for 1995–96, but similar to the mean of 30% during 1990–94. Local residents continue to comprise the majority of goat hunters in Unit 1D. In 1997 and 1998, residents of the subunit took 56% and 89% of harvested goats, respectively. In 1997 nonlocal Alaska residents took 11 of the 27 goats harvested. In 1998 non-local Alaska residents only harvested 2 goats. Few nonresidents hunt goats in Unit 1D, and they took only 2 of the 54 goats harvested during this report period.

Harvest Chronology. Goats can be hunted in Unit 1D from August 1 through December 31, but the season varies by hunt area. Over the years most goats have been harvested in October, with September being the next most popular month. During this report period the trend continued, with 52% of the goats harvested in October, and 22% in September.

Transport Methods. Boats and highway vehicles are the transport methods used most often by successful hunters, amounting to 36% and 38%, respectively during the report period (Table 5). It is interesting to note the differences in transportation used between 1997 and 1998. In 1997 48% of successful hunters used highway vehicles while only 26% used boats, but in 1998 almost the opposite occurred with only 27% using highway vehicles and 46% using boats. The increase in hunters using boats for transportation is related to heavy snows forcing goats down to low

elevations along Lynn Canal where they were vulnerable to harvest. From 1990–1996 boat access has accounted for 50% of successful hunters while highway vehicles accounted for 32%. Some hunters walk to their hunting area along the Haines Highway, especially residents of Klukwan.

Commercial Services. Most goat hunters do not use commercial services in Unit 1D (Table 6). Most people have access to either a highway vehicle or a boat and are able to provide their own transportation. During the report period only 10 of 168 hunters used commercial services, and 7 of these were nonresidents who had to be accompanied by a guide while goat hunting.

CONCLUSIONS AND RECOMMENDATIONS

Finer scale management of mountain goats is becoming necessary in Unit 1D as hunting pressure increases. There are now 3 open permit hunt areas with harvest guidelines developed for each area. To meet the division's goal of simplification of regulations and permits, a single permit will continue to be used for multiple hunts within Unit 1D. Careful population and harvest monitoring is necessary, and closures may be required to avoid excessive harvest in areas where hunting pressure is concentrated. This is especially true along the Haines road system, and parts of Lynn Canal where goats typically can be found at low elevations and vulnerable to hunting during heavy snow years. Composition surveys should be conducted annually in these areas. The closed area between Taiya Inlet and the Yukon and White Pass Railroad should be surveyed again to assess the goat population and the possibility of reopening the area to goat hunting. Any hunt in this area would have to be monitored closely to prevent overharvest and would almost certainly be managed with a registration or drawing permit. Finally, consistent surveys of areas with well-defined boundaries rather than basic trend routes are needed to improve population estimates and monitor population trends within the subunit. The importance of surveys will continue to increase as management becomes more area-specific and pressure on goats increases from activities other than hunting such as helicopter flightseeing and heliskiing. Our willingness to assist the BLM with interpretation of their survey data in Unit 1D will vastly improve our understanding of the goat populations in this subunit.

LITERATURE CITED

HUNDERTMARK K. J., W. L. EBERHARDT, AND R. E. BALL. 1983.Winter habitat utilization by moose and mountain goats in the Chilkat Valley. Alaska Dept. of Fish and Game. Final report for the Haines-Klukwan Cooperative Resource Study. 44pp.

SCHOEN J. W. AND M. D. KIRCHHOFF. 1982. Habitat use by mountain goats in southeast Alaska. Final Rept. Fed. Aid. Wildl. Restor. Proj. W-17-10, W-17-11, W-21-1, W-21-2, Job 12.4R. Alaska Dept. of Fish and Game, Juneau. 67pp.

PREPARED BY:
Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1a Unit 1D mountain goat composition counts, Skagway closed area, 1981–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
1981	73	22	95	30	23	60
1983	26	5	31	19	16	56
1984	27	13	40	48	33	36
1985	29	3	32	10	9	25
1986	13	5	18	38	28	28
1987	7	0	7	0	0	55
1988			No survey			
1989	17	6	23	35	26	35
1990–91			No survey			
1992	1	0	1	0	0	3
1993			No survey			
1994[1]	11	5	16	45	31	20
1995[2]	21	7	28	33	25	N/A
1996			No survey			
1997–98			No survey			

[1] Skagway Pass side only, goats/hour is for the entire survey that included a portion of Hunt Area RG023.

[2] Includes only the west side of closed area, adjacent to the Taiya R.

Table 1b Unit 1D mountain goat composition counts, hunt areas RG023 and RG024, 1990–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Klukwah Mt. (K) and Ferebee Gl./River (F) to Chilkoot Inlet						
1989 (K)	26	9	35	35	(26)	60
1993			No survey			
1994 (K,F)[1]	111	21	131	19	(16)	45
1995[2]	52	15	67	29	(22)	89
1996–97	*No survey*					
1998	69	23	92	33	(25)	58
Takshanuk Mtns. (E, W)						
1989 (E,W)	40	16	56	40	(29)	34
1993 (W)	27	7	35	26	(20)	59
1994 (E,W)	48	5	53	10	(9)	17
1995	19	4	23	21	(17)	N/A
1996–97			No survey			
1998	22	6	28	27	(21)	20
North of the Klehini River and West of the Chilkat River						
1989	23	6	29	26	(21)	70
1993			No survey			
1994	58	4	62	7	(6)	69
1995	55	9	64	16	(14)	116
1996–98	No survey					
East of Ferebee Gl./River (F), Chilkoot/Taiya Inlet						
1989 (F,C)	39	17	56	44	(30)	40
1992 (F,C)	30	10	40	33	(33)	19
1993			No survey			
1994 (F,C)	119/130	21/33	140/163	18/25	(15/20)	46/59
1995–98	No survey					
	Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass					
1995	64	9	73	14	12	50.5
1996–98	No survey					
	Twin Dewey Peaks, Skagway Pass, Warm Pass					
1995	20	6	26	30	(23)	20
1996–98	No survey					
	Katzehin River north to Twin Dewey Peaks					
1994	121	32	153	26	21	102
1995	No survey					
1996	103	26	129	25	20	105
1997	96	15	111	16	14	80
1998	No survey					

[1] First survey listed conducted by the Bureau of Land Management in a PA-18 aircraft; this survey does not overlap with the ADF&G survey.

[2] Includes only the Chilkoot R. side of the mountain range from Klukwah Mt. to Chilkoot Inlet.

Table 1c Unit 1D mountain goat composition counts, hunt area RG026, 1988–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Tsirku River (T) and Takhin Ridge (N,S)						
1983 (T)	67	23	90	34	(26)	29
1985 (S)	41	13	54	32	(24)	69
1987 (N,S)	14	4	18	29	(22)	11
1989 (N,S)	111	33	144	30	(23)	126
1993 (N,S)	100	21	121	21	(17)	112
1994 (T,N,S)[1,2]	129	29	156	22	(19)	48
1995–98	No survey					
Remainder of Area West of Chilkat Inlet						
1974	39	3	42	8	7	72
1975	20	9	29	45	31	---[3]
1993			No survey			
1994	184	32	213	17	15	49
1995–98	No survey					
East of Chilkoot Inlet-Katzehin River South						
1993			No survey			
1994	32	10	42	31	24	98
1995–96			No survey			
1997	5	2	7	40	29	N/A
1998			No survey			

[1] First survey listed conducted by the Bureau of Land Management in a PA-18 aircraft.

[2] Survey consisted of a significantly larger area than previous surveys represented.

[3] The amount of time spent counting goats is not available.

Table 2 Unit 1D annual mountain goat harvest, 1988–98

Year	Males	Females	Unknown	Total
1990	18	12	1	31
1991	18	5	2	25
1992	9	11	3	23
1993	15	8	2	25
1994	12	12	1	25
1995	14	8	0	22
1996	12	8	0	20
1997	15	12	0	27
1998	20	6	1	27

Table 3 Unit 1D mountain goat hunter effort and success, 1990–98

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total nr days	Avg nr days	Nr hunters	Total nr days	Avg nr days
1990	193	31	56	1.8	71	116	1.6	102	172	1.7
1991	154	25	36	1.5	48	115	2.5	73	151	2.2
1992	130	23	35	1.5	47	115	2.4	70	150	2.1
1993	182	25	54	2.2	67	158	2.5	92	212	2.4
1994	171	25	64	2.6	79	168	2.3	104	232	2.4
1995	169	22	36	1.7	81	226	2.9	103	262	2.7
1996	176	20	32	1.6	75	152	2.2	95	184	2.1
1997	149	27	46	1.7	60	125	2.4	87	171	2.2
1998	157	27	64	2.6	69	168	2.6	96	230	2.6

Table 4 Unit 1D goat hunter success by community of residence, 1990–98

		Successful hunters			Unsuccessful hunters		
Year	Percent Success	Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1990	30	20	9	2	60	11	0
1991	34	21	4	0	32	16	0
1992	33	21	2	0	38	8	1
1993	27	17	6	2	51	16	0
1994	24	15	9	1	54	25	0
1995	21	13	7	2	61	20	0
1996	21	14	3	3	51	21	3
1997	31	15	11	1	45	14	1
1998	28	24	2	1	58	8	3

Table 5 Unit 1D transport methods used by successful goat hunters, 1990–98

	Airplane		Boat		Foot		Hwy vehicle		Other	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
1990	0	(0)	17	(55)	5	(16)	7	(23)	2	(6)
1991	0	(0)	13	(57)	1	(4)	9	(39)	0	(0)
1992	0	(0)	9	(41)	7	(32)	5	(23)	1	(5)
1993	3	(12)	12	(48)	0	(0)	8	(32)	2	(8)
1994	0	(0)	15	(60)	3	(12)	7	(28)	0	(0)
1995	1	(5)	8	(36)	0	(0)	11	(50)	2	(9)
1996	0	(0)	8	(44)	5	(28)	5	(28)	0	(0)
1997	0	(0)	7	(26)	5	(19)	13	(48)	2	(7)
1998	0	(0)	12	(46)	5	(19)	7	(27)	2	(8)

Table 6 Unit 1D commercial services used by goat hunters, 1991–98

Year	Unit residents		Other AK residents		Non-residents		Total use		Registered guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1991[1]	18	2	7	0	0	0	25	2	0	0	2
1992	48	0	9	0	0	0	57	0	0	0	0
1993	57	2	14	0	2	0	73	2	0	1	1
1994	64	0	28	1	0	1	92	2	1	1	0
1995	67	0	22	3	0	2	89	5	2	3	0
1996	56	0	19	1	0	4	75	5	4	1	0
1997	51	0	20	3	0	3	71	6	3	1	2
1998	77	0	10	0	0	4	87	4	4	0	0

[1] Only 37% of hunters reported whether they used, or did not use, commercial services in 1991.

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5800 mi^2)

GEOGRAPHIC DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent islands

BACKGROUND

Mountain goat populations were established on Baranof Island in 1923 when 18 animals were transplanted from Tracy Arm in Game Management Unit 1 (Burris and McKnight 1973). Goats were not believed to have been indigenous to the island, although early written Russian history is confusing with references to "white deer." Hunting was initiated in 1949 on descendants of the 1923 translocation efforts, and seasons have continued to this time. In 1976 a registration permit system was initiated and has continued. Since that time the harvest has ranged from 28 to 75 goats per year.

In the mid-1950s goats were transplanted to Chichagof Island (Burris and McKnight 1973), but populations did not become established. The last report of a goat on that island was in 1978 (Johnson 1981). Mountain goat populations do not exist on Admiralty or any other island in the unit. Baranof Island goats appear to be dispersing spatially and increasing numerically, with recent expansions of animals to the southern part of the island.

The effects of severe winters on goat populations are poorly understood. Consistent goat surveys are needed to better understand the effects of varying snow accumulations. Throughout most goat habitat on Baranof Island, hunter access is difficult. Weather patterns during open goat seasons play an important role in regulating the harvest.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Manage Baranof Island goat populations to provide for maximum sustained annual use by hunters and wildlife viewers. Maintain for an island-wide population in excess of 1000 goats.

MANAGEMENT OBJECTIVES

1. Maintain a population sufficient to provide an annual harvest of at least 35 goats;
2. Maintain a mountain goat population sufficient to provide an annual hunter success rate of at least 25%.

METHODS

Goat hunting in Unit 4 is administered through a registration permit system (hunt RG150). Hunters obtain permits without charge, but successful hunters are required to report within 10 days of taking a goat. All other permittees are required to report their hunt effort by mid-January. Information from the reports includes area hunted, number of days hunted, kill date, sex of goat harvested, transportation used, and any use of commercial services. Successful hunters are also encouraged to bring in the horns from their goat for age determination.

Late summer aerial surveys are conducted periodically in selected areas. During September 1998 an extensive survey designed to determine goat distribution was conducted island-wide.

Goat horns voluntarily submitted by successful hunters were examined during 1998. Incremental growth measurements, age, and width between horn bases were recorded on standardized forms (Appendix A), in an attempt to determine growth rates and characteristics of Baranof Island goats as they relate to varying winter severity. Although sample sizes were inadequate for statistical significance, this effort will continue.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

During September 1998 an extensive aerial survey of goat habitat on Baranof Island was conducted, resulting in a total of 1013 goats being tallied. This number should be viewed as a minimum number of goats inhabiting the island, as sightability data have not been established. I suspect that conditions were near optimal, resulting in at least 75% of all goats being seen. Under this assumption the goat population on the island may exceed 1250 animals. Additional survey effort should be expended in future years to determine sightability, leading to more precise population estimates.

Currently it appears that goat populations continue to expand both spatially and numerically on Baranof Island. However, because of differences in observers, pilots, area surveyed, and type of aircraft used, it is impossible to infer goat abundance from the number of goats observed per hour of survey time.

Summer range (alpine) is not currently threatened by destructive resource extraction activities (logging and mining with appurtenant roading), and winter range appears to be secure for the immediate future. The only recent population estimate for Baranof Island was in 1991 by E. L. Young at 1000 goats (cited by Faro 1994), and the population has undoubtedly increased since that time.

Population Composition

Kid percentages in the observed segment of the goat population have varied widely, from a low of 10 to a high of 41. These data should be viewed cautiously because of differences in observers, pilots, type of aircraft used, and timing of surveys. Hunters generally select males, so sex ratios in the harvest certainly do not reflect sex ratios in the population.

Distribution and Movements

Mountain goats inhabit all available summer range on Baranof Island north of Gut Bay and Whale Bay. Actual densities of goats on the various alpine areas are unknown, but I suspect that at least some of the areas are saturated. South of Whale and Gut bays there are sporadic goat observations made by the public, and I suspect that as populations increase those areas will support additional goats. Winter habitat is more difficult to define, but south-facing cliff areas are apparently preferred.

Horn Growth Rates

In an effort to better understand growth characteristics of Unit 4 goats, hunters were asked to voluntarily submit horns for aging and measuring. A total of 23 goats from the 1998 season yielded data on horn growth.

I suspect that horn growth reflects body growth patterns. Because no annuli are discernable until the goat reaches 1.5 years of age, and this "annulus" encompasses 2 growth years (0–0.5 and 0.5–1.5), the data cannot be used for analyses of single-year growth. Additionally, growth from the year of death cannot be reliably used, as growth may not be completed during that particular year. The 1998 horn measurements yielded 51 usable annuli that could be assigned to any one particular year.

Although data are preliminary, they suggest that horn growth (assumed to be a reflection of body condition) may have been better following relatively harsh winters. Intuitively this was opposite of my original hypothesis that winter severity could be assessed by poor horn growth because of diminished food intake. However, it may be that severe winter weather causes goats to move off of their traditionally used cliffs into habitat where they actually survive on a higher nutritional plane. At this point in the investigation, more data are needed to fully assess the effects of varying winter weather as it affects horn growth.

MORTALITY

Harvest

Season and Bag Limit	Resident and nonresident hunters Aug 1–Dec 31

1 goat by registration permit only.

Regulations adopted by the Federal Subsistence Board are identical to State regulations.

Board of Game Actions and Emergency Orders. No Board actions were taken and no emergency orders were issued during the period.

Hunter Harvest. During both 1997 and 1998, 326 registration permits were issued (Table 1). This resulted in 55 and 63 goats being legally harvested in 1997 and 1998, respectively. The percent of permittees who actually hunted was 42% and 49%, respectively, during the 2 years. For those hunters going afield, the success rate was 40% in both 1997 and 1998. Five-year averages for the period 1994–1998 were: permits issued, 315; hunters afield, 143; and reported goat harvest, 52. Hunters reported sex of goats in the harvest as 65% males in 1997 and 57% in 1998 (Table 1). With the current population estimate for goats in Unit 4 at 1,250 animals, documented harvest accounts for a mortality over 4.2% annually.

Permit Hunts. All goat hunting in Unit 4 is conducted under a registration permit system.

Hunter Residency and Success. Residents of Baranof Island continue to be the primary users (79% of hunters were local residents during 1998, Table 2). The proportion of nonresident-guided hunters appears to be increasing (6% in both 1997 and 1998), although numbers are still low.

Harvest Chronology. Weather appears to be the primary factor controlling hunter effort and chronology of the goat harvest in Unit 4. Typically, few goats are harvested during November and December when consecutive low-pressure systems bombard Southeast Alaska with rain and/or snow. During 1997, 24 goats (44%) were harvested during August, with lesser numbers in all other months (Table 3). During 1998, hunters took the largest monthly total during October, when 18 goats (29%) were reported harvested.

Transport Methods. Boats continue to provide the majority of transportation for Unit 4 goat hunters. During 1997 and 1998, hunters used boats for primary access, 55% and 79%, respectively (Table 4).

Other Mortality. No estimates of extent or causes of other goat mortality have been made. I suspect that bear-caused mortality occurs, but its significance is unknown. Winter starvation mortality and accidental deaths due to rockslides and avalanches undoubtedly take some toll on the goat population.

HABITAT

Assessment

No data are available regarding habitat quality. Relatively high numbers of kids observed during late summer composition surveys and good body condition of harvested goats suggests that habitat is in relatively good shape.

Enhancement

No habitat enhancement activities were conducted on goat range during this reporting period; there are no plans for future assessment or enhancement of goat habitat.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Efforts should continue to monitor timber extraction activities and additional road building associated with logging. On Baranof Island, habitat degradation activities appear to be minor.

CONCLUSIONS AND RECOMMENDATIONS

Unit 4 mountain goat populations appear to be secure at this time. Efforts should continue to determine effects of varying winter severity on goat populations through horn annuli measurements. I recommend that current state regulations remain in effect concerning season dates and bag limits. The current system of registration permit hunting appears to be working well and causes little additional effort on the part of hunters. I commend hunters for their willingness to voluntarily submit horn sets for aging and measurement. Future assessment work should be explored in an effort to determine sightability of goats. These data will allow better enumeration of goat populations on the island.

LITERATURE CITED

BURRIS, O. E. AND D. E. MCKNIGHT. 1973. Game transplants in Alaska. Alaska Dep. Fish and Game. Tech. Bull. No. 4. Juneau. 57pp.

FARO, J. B. 1994. Mountain goat survey-inventory management report. Pages 33–38 *in* M.V. Hicks, editor. Annual report of survey-inventory activities. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Proj. Rep. Proj. W-24-1 and W-24-2. Job 12. Juneau. 144pp.

JOHNSON, L. J. 1981. Mountain goat survey-inventory progress report. Pages 59–62 *in* R.A. Hinman, ed. Annual report of survey-inventory activities. Part III. Bison, caribou, mountain goat, muskoxen, and sheep. Vol XI. Alaska Dep. Fish and Game. Fed Aid in Wildl. Rest. Proj. Rep. Proj. W-17-12. Job 12. Juneau. 116pp.

PREPARED BY:

Jackson S. Whitman
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 4 mountain goat harvest data for registration permit hunt RG150, 1994/95–1998/99

Reg. year	Permits issued	Did not report	Did not hunt	Unsuccessful hunters	Success. hunters	Males	Females	Sex unk.	Illegal	Total harvest
1994	331	2	170	107	52	32	20	0	0	52
1995	319	2	178	90	49	34	15	0	0	49
1996	272	0	152	78	42	26	15	1	0	42
1997	326	0	188	83	55	36	18	1	0	55
1998	326	1	167	95	63	36	27	0	0	63

Table 2 Unit 4 mountain goat hunter residency and success for registration permit hunt RG150, 1994/95–1998/99

	Successful				Unsuccessful				
Reg. year	Local[a] resident	Nonlocal resident	Nonres	Total	Local[a] resident	Nonlocal resident	Nonres	Total	Total hunters
1994	45	3	4	52	88	17	2	107	159
1995	42	6	1	49	74	15	1	90	139
1996	41	1	0	42	66	11	1	78	120
1997	45	5	5	55	69	11	3	83	138
1998	48	8	7	63	77	16	2	95	158

[a]Residents of Baranof Island.

Table 3 Unit 4 mountain goat harvest chronology by month for registration permit hunt RG150, 1994/95–1998/99

Regulatory year	Harvest periods					
	August	September	October	November	December	Total
1994	13	8	12	3	16	52
1995	6	21	12	7	3	49
1996	4	13	3	9	13	42
1997	24	9	6	9	7	55
1998	11	12	18	13	9	63

Table 4 Unit 4 mountain goat harvest by transport method used by successful hunters for registration permit hunt RG150, 1994/95–1998/99

Regulatory year	Airplane	Boat	Snow machine	Offroad vehicle	Vehicle	Walked	Total
1994	12	34	0	1	5	0	52
1995	15	28	0	0	2	4	49
1996	12	25	1	0	3	1	42
1997	18	30	0	0	4	3	55
1998	8	50	0	1	3	1	63

Appendix A

MOUNTAIN GOAT HORN STUDY

NAME _____

DATE OF KILL _____

LOCATION OF HARVEST _____

_____

AGE OF GOAT _____ CERTAINTY? A B C

SEX OF GOAT _____

(all measurements to nearest 1/16 inch)

LENGTH OF LEFT HORN _____ BROOMED? Y N

BASAL CIRCUMFERENCE OF LEFT HORN _____

LENGTH OF RIGHT HORN _____ BROOMED? Y N

BASAL CIRCUMFERENCE OF RIGHT HORN _____

ANNULUS LENGTHS (Use longer horn)

0-1.5 years _____

1.5-2.5 years _____

2.5-3.5 years _____

3.5-4.5 years _____

4.5-5.5 years _____

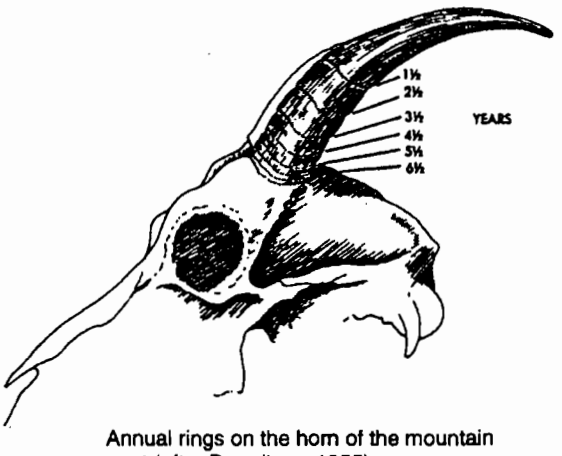
5.5-6.5 years _____

6.5-7.5 years _____

7.5-8.5 years _____

8.5-9.5 years _____

9.5-10.5 years _____



Annual rings on the horn of the mountain goat (after Brandborg 1955)

WIDTH BETWEEN HORN AND BASES _____

MEASUREMENTS RECORDED BY _____ DATE _____

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

BACKGROUND

Mountain goats have been present in the eastern Gulf Coast region since recorded history began. Klein (1965) surmised that goats extended north and west from a southern refugium and that the present northern and western limits of distribution may be the result of a relatively recent arrival in the area. Unlike other large mammals in the Yakutat Forelands area (*i.e.*, moose and bear), mountain goats may have traveled up the coast rather than down the Tatshenshini/Alsek River corridor.

Alaska Natives used mountain goat hides for clothing and other domestic purposes. Recreational hunting was occurring by the early 1970s, and probably earlier because Yakutat was the site of a large military base during World War II.

The Alaska Department of Fish and Game first conducted aerial goat surveys in this Unit in 1971. In that year, 283 goats (33 kids:100 adults) were enumerated between Gateway Knob and Harlequin Lake in the Brabazon Mountains. By 1973 Game Division biologists had documented a significant decline in goat numbers in the area, attributed primarily to severe winter weather. Surveys in Unit 5A during the 1980s and anecdotal accounts from guides, pilots, and hunters indicated that goat numbers were higher than recorded in the early 1970s. In the 1990s no aerial surveys were conducted, but anecdotal information from hunters and guides suggests that goats are relatively abundant throughout the area.

There is both a State registration permit hunt and a Federal subsistence hunt for goats in this Unit.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Management objectives identified by staff for mountain goat populations in Unit 5 are as follows:

1. Increase the estimated population from 850 to 1250 goats;

2. Maintain a hunter success rate of 25%;

3. Conduct aerial surveys in areas of concentrated harvest at least every 3 years.

METHODS

No aerial surveys were conducted within the Unit during the report period. This was the result of a combination of factors including weather, staffing changes, and loss of the assistant area biologist position for northern Southeast Alaska. Yakutat's distance from the Douglas Regional Office makes it difficult logistically to plan for and conduct aerial surveys there. Hunters were required to obtain registration permits from Fish and Game offices that allowed in-season monitoring of harvest effort and success. Information collected from registration reports included the number of days hunted, method of transportation used, hunt dates, commercial services used (for all hunters), and sex and date of kill (for successful hunters). Anecdotal information was gathered from hunters, ADF&G field personnel, and federal agency personnel stationed in Yakutat.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Surveys conducted in the late 1980s suggested that the goat population was stable to increasing based on the number of goats seen per hour during aerial surveys (Table 1). No information has been received that would indicate the goat population has declined since that time, and the Unit 5 goat population may number about 1,000 animals.

MORTALITY

Harvest

Season and Bag Limits:	Resident and nonresident hunters
1 goat by registration permit only.	Aug 1–Dec 31

Hunter Harvest. Twenty-one goats were harvested during the report period, 5 in 1997 and 16 in 1998. Two of the 5 goats harvested in 1997 were taken under Federal subsistence permits. The increase in harvest in 1998 is attributed to an increase in non-local resident and nonresident hunters (Table 3). The percentage of males harvested was 60% in 1997, 50% in 1998, and 57% overall. The 2-year average is slightly lower than the 64% male harvest over the previous 7 years (Table 2).

The harvest of 16 goats in 1998 was the highest since 1983 when 23 goats were killed. Goat hunting has never attracted a lot of attention in Yakutat. During 1990–96 the average harvest of goats in Unit 5 was only 8. The reduction in kill from the early 1980s appeared to be related more to decreased effort rather than reduced success rate or a decline in goat numbers (Table 3). During the 1995–96 reporting period effort increased but harvest decreased in relation to the preceding report period. In 1997–98 the number of hunters increased by 12 over the previous report period (Table 4), and the number of goats harvested increased from 13 to 21 animals (Table 2). Most of the harvest occurred in 1998 when heavy snowfall forced goats into low elevation habitat where they were vulnerable to harvest.

Illegal harvest remains unquantified but may be higher than previously thought. A recent enforcement operation resulted in the arrest of 2 Yakutat residents on charges of illegally harvesting goats.

Permit Hunts. A total of 53 and 56 registration permits were issued during 1997 and 1998, respectively, an increase in 1 permit over the previous reporting period (Table 4). Hunting effort differed dramatically between 1997 and 1998 with 17 people hunting in 1997 and 33 hunting in 1998. The increase was largely due to the addition of 10 nonresident hunters in 1998. The mean of 25 hunters each year of the report period is noticeably higher than during 1990–1996 when an average of 18 people hunted each year. The registration permit strategy remains a viable method for effectively managing goat hunting in the unit.

Information on the Federal Subsistence hunt (other than the 2 goats harvested) is not available at this time.

Hunter Residency and Success. Goat hunter success averaged 42%, substantially lower than that of the previous 2-year period (Table 3). Four of 5 1997 successful hunters were unit residents; in 1998 this ratio dropped to 5 of 16, with nonresidents accounting for 7 of the goats. The number of Alaska residents hunting during the 1997–98 period outnumbered nonresidents 36 to 14. Of the 36 resident hunters, 23 were Unit 5 residents. Nonresidents still account for a significant portion of the effort and harvest, with non-local resident effort and harvest being the smallest. The relatively low harvest by non-local Alaskans is partly due to the availability of other huntable goat populations in the state. The requirement that a guide must accompany nonresidents is not believed to have a negative effect on goat hunting in the Yakutat area.

Harvest Chronology. The Unit 5 goat harvest is usually spread throughout the season, with the greatest number of goats typically taken during September and October. The 1998 harvest was especially concentrated in October and November. This was due to an increase in late season hunting pressure, when goats were forced to lower elevations by snow and were accessible on cliffs in Russell Fiord.

Transport Methods. In 1997 all successful hunters used boats, but in 1998 40% of successful hunters used aircraft and 60% of successful hunters used boats. Most hunters who used aircraft to access goat hunting areas were guided nonresidents.

Other Mortality

Some anecdotal reports were received from guides and hunters regarding wolf predation on goats, but there is no evidence that it has a major effect on the population. Winter weather probably plays more of a factor in goat mortality, as Yakutat often gets large amounts of snow and severe winter weather.

CONCLUSIONS AND RECOMMENDATIONS

Efforts to obtain mountain goat population information through aerial sex and age composition counts should be a priority during the next report period. Hunting pressure appears to be increasing, and better population information, especially in areas of concentrated harvest, is essential. Despite this information void, our hunt records indicate that hunting effort has been

quite low and it is likely that goat populations could support additional harvest in all but the most popular hunt areas.

LITERATURE CITED

Klein, D. R. 1965. Postglacial Distribution Patterns of Mammals in the Southern Coastal Regions of Alaska. Arctic, Vol. 18, No. 1.

PREPARED BY:
Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1 Unit 5 mountain goat composition counts, 1986–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	Percent kids	Goats/ hour
1986	36	11	47	31	23	40
1987	196	53	249	27	21	60
1988	140	53	193	38	27	56
1989	64	29	93	45	31	47
1990–98			No surveys			

Table 2 Unit 5 annual goat harvest, 1990–98

Year	Males	Females	Unknown	Total
1990	11	2	0	13
1991	4	4	0	8
1992	2	2	0	4
1993	4	2	0	6
1994	6	6	0	12
1995	4	2	0	6
1996	5	2	0	7
1997	3	2	0	5
1998	9	6	1	16

Table 3 Unit 5 goat hunter success by community of residence, 1990–98

		Successful hunters			Unsuccessful hunters		
Year	Percent success	Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1990	43	3	4	6	3	11	3
1991	47	2	5	1	1	2	6
1992	31	2	2	0	1	2	6
1993	50	0	0	6	3	0	3
1994	71	8	3	1	2	1	2
1995	29	2	0	4	10	2	3
1996	39	3	1	3	4	4	3
1997	29	4	1	0	6	4	2
1998	48	5	4	7	8	4	5

Table 4 Unit 5 goat hunter effort and success, 1990–98

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days	Nr. hunters	Total days	Avg nr days
1990	46	13	42	3.2	17	80	4.7	30	122	4.1
1991	42	8	22	2.8	9	16	2.7	17	38	2.7
1992	35	4	8	2.0	9	29	3.2	13	37	2.8
1993	39	6	12	2.0	6	25	4.2	12	37	3.1
1994	41	12	28	2.3	5	12	2.4	17	40	2.4
1995	57	6	19	3.2	14	47	3.4	20	66	3.3
1996	51	7	17	2.4	11	48	4.4	18	65	3.6
1997	53	5	8	1.6	12	26	2.6	17	34	2.3
1998	56	16	55	3.4	17	59	3.5	33	114	3.5

Table 5 Unit 5 transport methods used by successful goat hunters, 1990–98

	Airplane		Boat		Snowmachine		Highway vehicle		Foot	
Year	Total	%	Total	%	Total	%	Total	%	Total	%
1990	11	85	0	0	2	15	0	0	0	0
1991	4	50	4	50	0	0	0	0	0	0
1992	2	50	2	50	0	0	0	0	0	0
1993	4	66	1	17	0	0	0	0	1	17
1994	0	0	9	75	3	25	0	0	0	0
1995	6	100	0	0	0	0	0	0	0	0
1996	3	43	4	57	0	0	0	0	0	0
1997	0	0	5	100	0	0	0	0	0	0
1998	6	40	9	60	0	0	0	0	0	0

Table 6 Unit 5 commercial services used by goat hunters, 1990–98

	Unit residents		Other AK residents		Nonresidents		Total use		Registered
Year	No	Yes	No	Yes	No	Yes	No	Yes	guide
1990	0	0	0	0	0	6	0	6	6
1991	2	1	2	4	0	6	4	11	6
1992	3	0	1	1	1	7	5	8	6
1993	0	0	0	0	0	6	0	6	6
1994	8	0	0	1	0	3	8	4	4
1995	11	1	2	0	0	7	13	8	7
1996	4	0	1	3	0	5	5	8	6
1997	7	2	4	1	0	2	11	5	2
1998	12	0	4	3	0	12	16	15	2

LOCATION

GAME MANAGEMENT UNIT: 6 (10,140 mi^2)

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Mountain goats are endemic to mountains on the mainland in Unit 6 and to Bainbridge, Culross and Knight Islands. Captain Cook in 1785 (Beaglehole 1966), Edmond Heller in 1908 (1910), Clarence Rhodes in 1938 (ADF&G files), and Fred Robards in 1952 (ADF&G files) documented their presence. Robards estimated 4350 goats between Cape Fairfield and Bering Glacier, which includes most of Unit 6.

Several significant events caused reductions in the population. Art Sheets, game biologist with ADF&G, reported evidence that military personnel stationed in Whittier reduced goat numbers in Port Wells in the 1940s. He reported similar evidence for reductions in the Puget Bay area during the 1950s by military personnel stationed in Seward. Populations also may have suffered significant natural mortality during the severe winters of 1971 and 1975. Goats may not have recovered because of predation (Reynolds 1981) and hunter harvest. Hunting during the early 1980s caused additional declines (Griese 1988*a*), while wolf predation increased (Griese 1988*b*). By 1987 the population was approximately 3400. It declined to 2790 by 1994 but increased significantly during the mid-to-late 1990s.

Population surveys began with aerial composition flights in 1969. Methods were not standardized until 1986, when surveys were improved by establishing count areas that were systematically searched (Griese 1988*a*).

Harvest management evolved as biologists recognized the need to manage mountain goats based on small geographic units (Foster 1977) to reduce harvest and to distribute hunting pressure. Long seasons with bag limits of 1 or 2 goats were in effect from statehood through 1975. The bag limit was reduced to 1 goat in 1976, and the first permit hunt was established in 1980. By 1986 the present system of registration permit hunts was in place.

Management guidelines were clarified in 1993 when a harvest tracking strategy (Caughley 1977, Smith 1984) was fully implemented. The 3 elements essential for implementation of the strategy were: 1) improved aerial survey methods for obtaining trend information, 2) registration permit hunts allowing careful monitoring of harvest distribution and magnitude, and 3) establishing a minimum population objective of 2400 goats for Unit 6. Implementation of the strategy provided the conceptual framework necessary to guide decisions about harvest. In response to declining populations in most of the unit, we reduced harvest and prohibited hunting of small groups of goats (<60) during the early and mid 1990s.

We have monitored harvest since 1972, using hunter reports. Both successful and unsuccessful hunters were required to report, with the exception of 1980 through 1985, when only successful hunters reported. Annual harvest reached an historic high of 182 animals in 1983–84 and declined to an historic low of 35 goats in 1996–97.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a minimum population of 2400 goats
- Achieve a minimum of 70% males in the harvest.

METHODS

We conducted aerial surveys to estimate mountain goat population size, trend, and composition in permit hunt areas (Fig. 1). Individual hunt areas were usually surveyed during August and September at 2–3-year intervals. Each area was divided into 1 or more sample units. Units were 5 to 70 mi^2 and encompassed alpine cover types above 1000 ft elevation. Large glaciers (>1mi^2) were excluded from sample units. However, the edges of glaciers were searched (up to 300 ft), and goats observed were included in the count. Where possible, sample units were separated by geographic barriers to minimize variability due to movement of goats among units. Boundaries were drawn on 1:63,360 scale, topographic maps.

Sample units were searched using a Piper Super Cub (PA-18) or Bellanca Scout aircraft on wheels with pilot and 1 observer onboard. The pilot maintained airspeed of 60 to 70 mph and stayed 300 to 500 ft from slopes or cliffs. Flights were made in the morning within 3 hours after sunrise or in the evening within 3 hours of sunset. Flight lines followed contours, starting at the tops of ridges and repeating passes downward in elevation, or starting at treeline and repeating passes upward in elevation. Width of the search area between passes was limited to no more than 500 ft elevation or 1/8 mile. Observations were generally made on the side of the aircraft toward steep topography. Searches were completed drainage by drainage to avoid duplicate counts and to insure systematic coverage.

The observer recorded start and stop times and calculated search effort (minutes/mi^2) for each survey. Number of kids and goats older than kids were recorded for each group. Goat observations and flight lines were plotted on sample unit maps. We also recorded environmental conditions during the survey to evaluate survey quality as excellent, good, or poor. We noted cloud cover, turbulence, wind speed, and light type and intensity. Excellent conditions were overcast skies, soft light, and no turbulence (Nichols 1980). Good conditions were combinations of partly cloudy to clear skies, direct light, and mild turbulence. Poor conditions were combinations of clear skies, bright light, and mild to severe turbulence.

We summarized most survey results by hunt area and unit. We also summarized data from Unit 6D into western and eastern portions. The line dividing Unit 6D into western and eastern portions was drawn from Hinchinbrook Entrance through Valdez Arm, Port Valdez, and Lowe River. Summaries included goats observed, number of goats older than kids, percent older goats, number of kids, percent kids, and kids:100 older goats. Size of the goat population was estimated by assuming 70%, 80% and 90% of goats were observed during surveys that were poor, good, or excellent quality, respectively. The population was estimated during years when surveys were not completed by considering most recent surveys, harvest, and probable productivity and survival.

Harvest was monitored through permit hunt reports that we required from all hunters. Hunters not reporting were sent up to 2 reminder letters. To minimize kill of females, hunters were given an information leaflet that presented methods of differentiating sexes of goats at a distance and explained benefits of selectively harvesting males. Hunters were not required to have horns checked by department staff to identify sex, with the exception of those taking goats in Unit 6C.

We also summarized data from Unit 6D into western and eastern portions. In addition to standard ADF&G harvest parameters, we calculated a weighted total harvest by multiplying number of males taken by 1 and number of females and unknowns taken by 2. Weighted harvest rate was also determined for each unit by dividing weighted total harvest by the estimated population in permit hunt areas.

A maximum allowable harvest (MAH) for each year was established for each permit hunt. It was calculated as a percentage of goats observed during the most recent survey. The percent applied ranged from 2.2% to 5.5%, depending upon population trend, estimated mortality, and elapsed time since the last survey. For example, hunts with decreasing population trend, high mortality, and survey data several years old had an MAH of 2.2% to 3.0%. Permit hunts were closed by emergency order if weighted harvest reached MAH.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We completed aerial surveys in all or part of 13 permit hunt areas during this reporting period. We counted 1922 goats during 1997 and 1472 goats in 1998 (Table 1). Flights were a joint effort with USFS, Cordova and Glacier Ranger Districts, who helped fund aircraft charter and provided an observer. We estimated 4020 goats unit-wide in 1997–98 and 4050 goats in 1998–99.

Population size and trend varied among units over the past 5 years. Units 6D (West) and 6D (East), which had the largest numbers of goats, have been increasing since 1995–96 (Table 1). The goat population in Unit 6C increased annually since the hunt closed in 1989. Between 1994–95 and 1997–98, population size doubled in Unit 6C (Table 1). However, exceptional survey conditions may have contributed to the high count in 1997. Goat populations in Units 6A and 6B increased by 5% and 17%, respectively, between 1996–97 and 1998–99.

Data for the past 10 years indicate long-term trends of goat populations in Unit 6 (Fig. 2). Goat numbers in Unit 6A declined by 49% through 1994, but have since stabilized and slightly increased. Unit 6B population declined in the late 1980s, was stable during 1990–1994, then increased through 1998. Unit 6C goats increased steadily because hunting was closed in 1989; this population more than tripled by 1998. The Unit 6D (West) population increased by 33% between 1988 and 1992–93, decreased slightly during the next 2 years, then resumed increasing through 1998. The Unit 6D (East) goat population decreased by 31% between 1987–88 and 1994–95, then increased to an historic high by 1998.

Results of aerial goat surveys can be extremely variable (Ballard 1975, Fox 1977). We attempted to minimize variability by standardizing methods and by surveying mostly during excellent or

good conditions. Of 37 sample units completed during 1997 and 1998, 14 were rated as excellent and 23 were good.

Population Composition

The kid-to-older goat ratio and percent kids for all areas counted during 1997–98 were 25:100 and 20%, respectively (Table 1). These values for 1998–99 were 15:100 and 13%, respectively; the lowest recorded in over a decade. Kids observed during goat surveys over the past 10 years averaged 18% (SD = 3%) in Unit 6. On the Kenai Peninsula (Del Frate 1996) and Kodiak Island (Smith & VanDaele 1987), values less than 20% and 17% kids, respectively, indicated poor productivity and declining populations.

MORTALITY

Harvest

Season and Bag Limit. The mountain goat season in Units 6A and 6B was 20 August to 31 January and in Unit 6D was 15 September to 31 January. Hunts in 6C were limited to 2 periods during 9–15 October and 13–19 November. The bag limit was 1 goat by registration permit only. Permit hunts were opened in all units including 6C, which had been closed since 1989.

Board of Game Actions and Emergency Orders. The Board of Game changed the opening date for seasons in Units 6C, 6D (East) and 6D (West) from 20 August to 15 September beginning in 1997/98. This resulted from a public proposal objecting to an increasingly earlier harvest when trophy quality of hides was poor. This shift occurred because hunters concentrated effort early in the season in response to lower MAH and emergency closures of hunt areas. The department supported the proposal to increase trophy quality and to reduce harvest control problems in Units 6D (East) and 6D (West).

Seven emergency orders were issued closing registration permit hunts when MAH was reached (down from eleven emergency orders during the last reporting period). During 1997–98, hunts RG215, RG226, RG231, and RG242 were closed. During 1998–99, hunts RG226, RG242, and RG249 were closed. These were routine management actions.

Hunter Harvest. Hunter harvest declined to the lowest level in the history of goat hunting in Unit 6 in 1996/97. Goat populations responded favorably to reduced MAH's, allowing an increase in harvest during this reporting period. Unweighted and weighted harvest during 1997–98 was 67 and 76, respectively (Table 2). Harvest during 1998–99 was 75 and 88, respectively. The harvest included 58 males (87%) and 9 females (16%) during 1997–98. In 1998–99, the sex composition was 62 males (85%) and 11 females (15%) and 2 of unknown sex.

Sex composition of the harvest varied by unit. In Units 6A and 6B, most hunters were guided nonresidents who reported taking 90–100% billies (Table 2). Sex verification was not required for these units, but in general guides are motivated to take billies and report accurately. Sex verification is required for Unit 6C hunters (most of whom were locals), who harvested 70% billies. Most hunters in Unit 6D were nonlocal residents who reported 89% and 84% billies during this period. Hunters were aware that nannies counted as 2 goats toward the harvest quota, sex verification was not required, and therefore some hunters may have been reluctant to report taking a nanny. We suspect that sex composition may be biased towards billies in Unit 6D.

MAH during 1997–98 and 1998–99 was 114 and 117, respectively (Table 2). Weighted harvest exceeded MAH in only 2 of 25 hunts during this reporting period. In Unit 6A, weighted harvest rates averaged 1.7% since 1989–90 (Fig. 4). In Unit 6B, the average was 2.0% since 1989/90 (Fig. 5). The harvest in Unit 6C during the reporting period was 3.7. In Units 6D (East) and 6D (West), the averages were 1.4% and 3.6%, respectively, since 1989–90 (Figs 6 and 7). Conservative MAH's and resulting low harvest were part of our harvest tracking strategy for hunted populations that were declining, and where kid survival was poor. Under these conditions hunter take was considered additive to other mortality factors (Hebert & Turnbull 1977, Adams & Bailey 1982). We did allow a higher harvest rate (8.2% and 6.2%) in Unit 6D (West) when the population increased in the late 1980s and early 1990s. Most of our harvest rates were conservative compared to unweighted rates of 7% in Colorado (Adams & Bailey 1982), 5% in Alberta (Hall 1977), and 4% in Idaho (Kuck 1977).

Permit Hunts. Number of permits issued reached an historic low of 148 in 1995–96, then progressively increased to 268 by 1998–99 (Table 2). Registration permits were first required in the entire unit in 1981–82. The number issued reached a peak of 796 in 1983–84 and then steadily declined. The downward trend reflects the long-term decline in hunting opportunity.

Hunter Residency and Success. Most goat hunters during this reporting period were residents of Alaska but did not live in Unit 6 (Table 3). Hunter success during the reporting period averaged 56.5%, which was within the normal range during the last 5 years. There was a unitwide increase in the number of goat hunters during the reporting period, probably in response to higher MAH's and hunts remaining opened longer.

Harvest Chronology. September and October were the most productive months for goat harvest during the reporting period (Table 4). During 1995–96 and 1996–97 much of the harvest had occurred in August in response to lower MAH and emergency closures of hunt areas. Changing the season opening to 15 September resulted in a later-season harvest and eliminated complaints about hide quality.

Transport Methods. Airplanes were the most important means of hunter transport in Units 6A and 6B (Table 5). In Unit 6C highway vehicles were the primary mode of transportation. In Unit 6D boats followed by airplanes were primarily used. Ground transportation was reported for the first time in Unit 6A during 1998/99. This was probably a result of the logging road that now extends from Icy Bay to the Yakataga River valley.

Other Mortality

Predation by wolves was a source of natural mortality, particularly in Units 6A and 6B where wolf density was greatest. Pilots in Units 6A and 6B have occasionally reported Wolf predation on goats. However, Carnes (1996) found little evidence of significant wolf predation in Unit 6, during the early to mid 1990's. He reported that the wolf population probably peaked during the early to late 1980's and then declined during the following decade to a stable, relatively low density. Hence, wolf predation may have been a more important factor in the past than it is currently.

HABITAT

Old-growth forest provides important winter habitat for goats along the coast of Alaska (Schoen and Kirchoff 1982, Fox 1979, Fox et al. 1989). We recognize the potential for clearcut logging to negatively affect populations through removal of old-growth timber and subsequent improved human access. Logging roads can result in increased legal harvest, illegal harvest, and disturbance (Arnett & Irwin 1989, Fox et al. 1989).

Logging commenced on the western shore of Icy Bay in the mid 1960s. Clearcutting and a road system progressed westward toward Cape Yakataga through the 1970s and 1980s. Logging began in the White River watershed during spring 1995 and has since proceeded westward toward Cape Yakataga. The logging company will begin clearing in hunt area RG204 along the North Fork Yakataga River during spring 2001 in the Porcupine Creek drainage. RG204 has the largest population (200 goats) in Game Management Unit 6A.

Historical trends of mountain goat populations in the area indicate the effect of removing winter habitat. The White River to Icy Bay hunt area (RG202), numbered approximately 400 goats in 1977, and has since steadily declined to 77 in 1998–99, representing an 80% decrease. There was excessive legal harvest and poaching in RG202 during the 1970s and early 1980's because of easy access by logging roads. There was little protection given to winter goat habitat, nor mitigation for the loss of goat habitat. Despite low wolf density (Carnes 1996) and restricted hunter harvest, the goat population has dropped 30% since 1989. Goat populations in adjacent unlogged hunt areas have been increasing, despite hunter harvest and continued wolf predation.

CONCLUSIONS AND RECOMMENDATIONS

We achieved our objective for maintaining a minimum population size of 2400 goats. Estimated number at the end of this reporting period was 4049. The population increased by 13% since the last reporting period, indicating that our harvest tracking strategy was successful. Weighted harvest rate of declining populations was restricted to <3.5%, and hunting was closed where goat numbers approached minimum acceptable levels. This facilitated some population improvement, despite poor kid survival. We allowed higher harvest of stable or increasing populations. However, weighted harvest rate in the future should not exceed 6%, unless kid survival improves.

We achieved our objective of 70% males in the harvest. However, hunter reports were perhaps biased. The requirement that hunters have sex verified by ADF&G staff was suspended during the last reporting period, and hunters may have been reluctant to voluntarily report harvest of females. This bias was likely limited to Unit 6D.

The harvest tracking strategy should be refined by establishing minimum acceptable populations in each permit hunt area. This would simplify decision-making in chronically declining situations. It would be clear when to apply a lower harvest rate and when to close the season. Currently, decisions in hunt areas can be complicated because the minimum population objective applies unitwide.

LITERATURE CITED

ADAMS, L. G., AND J. A. BAILEY. 1982. Population dynamics of mountain goats in the Sawatch Range, Colorado. Journal of Wildlife Management. 46(4):1003–1009.

ARNETT, E. B., AND L. L. IRWIN. 1989. Mountain goat/forest management relationships: a review. NCASI. New York, New York, USA.

BALLARD, W. B. 1975. Mountain goat survey technique evaluation. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Final Report. Project W-17-7, Job12.2R. Juneau, Alaska, USA. 25pp.

BEAGLEHOLE, J. C., editor. 1966. The exploration of the Pacific: the journals of Captain Cook. London, England.

CARNES, J. C., VANBALLENBERGHE, V., AND PEEK, J. M. 1996. Ecology of wolves on the Copper and Bering River Deltas, Alaska. Progress Report. University of Idaho, Moscow.

CAUGHLEY, G. 1977. Analysis of vertebrate populations. John Wiley and Sons, New York, New York, USA.

DEL FRATE, G. G. 1996. Units 7 and 15 mountain goat. Pages 81–118 *in* M.V. Hicks, editor. Management report of survey-inventory activities. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Grants W-24-2, W-24-3, Study 12.0. Juneau, Alaska, USA. 152pp.

FOSTER, B. R. 1977. Historical patterns of mountain goat harvest in British Columbia. Pages 147–159 *in* W. Samuel, and W. G. MacGregor, editors. Proceedings of the 1st international mountain goat symposium. Province of British Columbia. Victoria, British Columbia, Canada.

FOX, J. L. 1977. Summer mountain goat activity and habitat preference in coastal Alaska as a basis for the assessment of survey techniques. Pages 190–199 *in* W. Samuel, and W. G. MacGregor, editors. Proceedings of the 1st international mountain goat symposium. Province of British Columbia. Victoria, British Columbia, Canada.

———. 1979. Site selection by mountain goats wintering in forest habitat. Unpublished Report. College of Forest Resources, University of Washington. Seattle, Washington, USA.

———., C. A. SMITH, AND J. W. SCHOEN. 1989. Relation between mountain goats and their habitat in Southeastern Alaska. US Department of Agriculture. Portland, Oregon, USA.

GRIESE, H. J. 1988*a*. Unit 6 mountain goat. Pages 26–35 *in* S.O. Morgan, editor. Annual report of survey-inventory activities. Part VII. Volume XVIII. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Project W-22-6, Job 12.0. Juneau, Alaska, USA. 53pp.

———. 1988*b*. Unit 6 wolf. Pages 17–19 *in* S.O. Morgan, editor. Annual report of survey-

inventory activities. Part XV. Volume XVIII. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Project W-22-6, Job 14.0. Juneau, Alaska, USA. 64pp.

HALL, W. K. 1977. Status and management of the Rocky Mountain goat, *Oreamnos americanus*, in the Province of Alberta. Pages 8–14 *in* W. Samuel, and W. G. MacGregor, editors. Proceedings of the 1st international mountain goat symposium. Province of British Columbia. Victoria, British Columbia, Canada.

HEBERT, D. M., AND W. G. TURNBULL. 1977. A description of southern interior and coastal mountain goat ecotypes in British Columbia. Pages 126–146 *in* W. Samuel, and W. G. MacGregor, editors. Proceedings 1st international Mountain Goat Symposium. Province of British Columbia. Victoria, British Columbia, Canada.

HELLER, E. 1910. Mammals of the 1908 Alexander Alaska expedition. University of California Publications in Zoology. 5(11):321–360.

KUCK, L. 1977. Status and management of mountain goats in Idaho. Pages 37–40 *in* W. Samuel, and W. G. MacGregor, editors. Proceedings of the 1st international mountain goat symposium. Province of British Columbia. Victoria, British Columbia, Canada.

NICHOLS, L. 1980. Mountain goat management technique studies. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Research Final Report. Project W-17-9, W-17-10 and W-17-11, Jobs 12.2R and 12.3R. Juneau, Alaska, USA 51pp.

REYNOLDS, J. R. 1981. Unit 6 mountain goat survey-inventory progress report. Pages 203–211 *in* R. Hinman, editor. Mountain goat. Part II. Volume XXII. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Annual report of survey-inventory activities. Project W-19-1 and W-19-2, Jobs 3.0, 1.0 and 12.0. Juneau, Alaska, USA 223pp.

SCHOEN, J. W. AND M. D. KIRCHOFF. 1982. Habitat use by mountain goats in southeast Alaska. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Project W-17-10, W-17-11, W-21-1 and W-2-1-2, Job 12.4R. Juneau, Alaska, USA. 67pp.

SMITH, C. A. 1984. Evaluation and management implications of long-term trends in coastal mountain goat populations in southeast Alaska. Biennial Symposium of the Northern Wild Sheep and Goat Council. 4:395–424.

———, AND L. J. VANDAELE. 1987. Terror Lake hydroelectric project final report on mountain goat studies. Alaska Department of Fish and Game. Kodiak, Alaska, USA. 38pp.

PREPARED BY:

Dave Crowley
Wildlife Biologist II

SUBMITTED BY:

Mike McDonald
Wildlife Biologist III

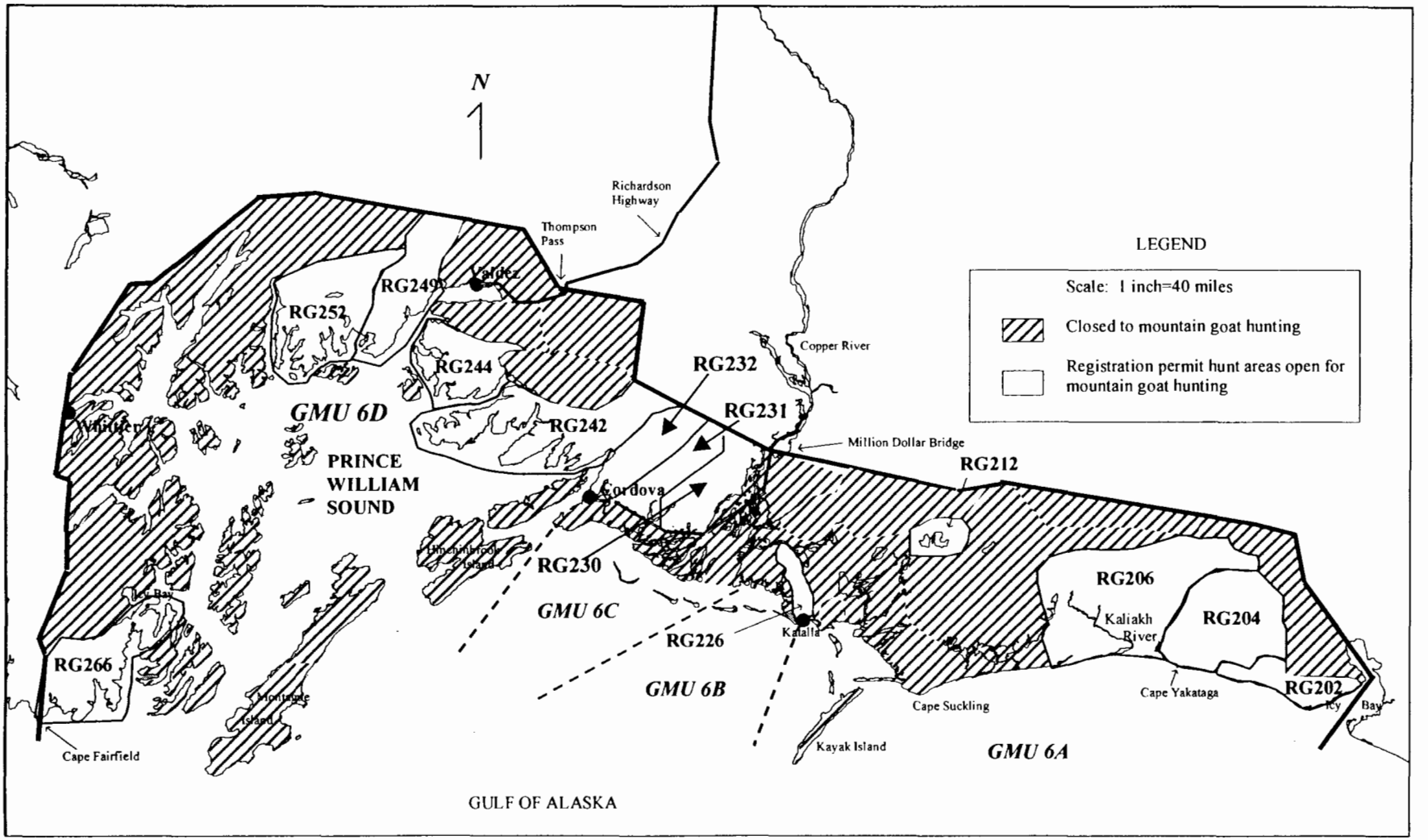


Figure 1 Unit 6 mountain goat registration permit hunts 1994 – 1998.

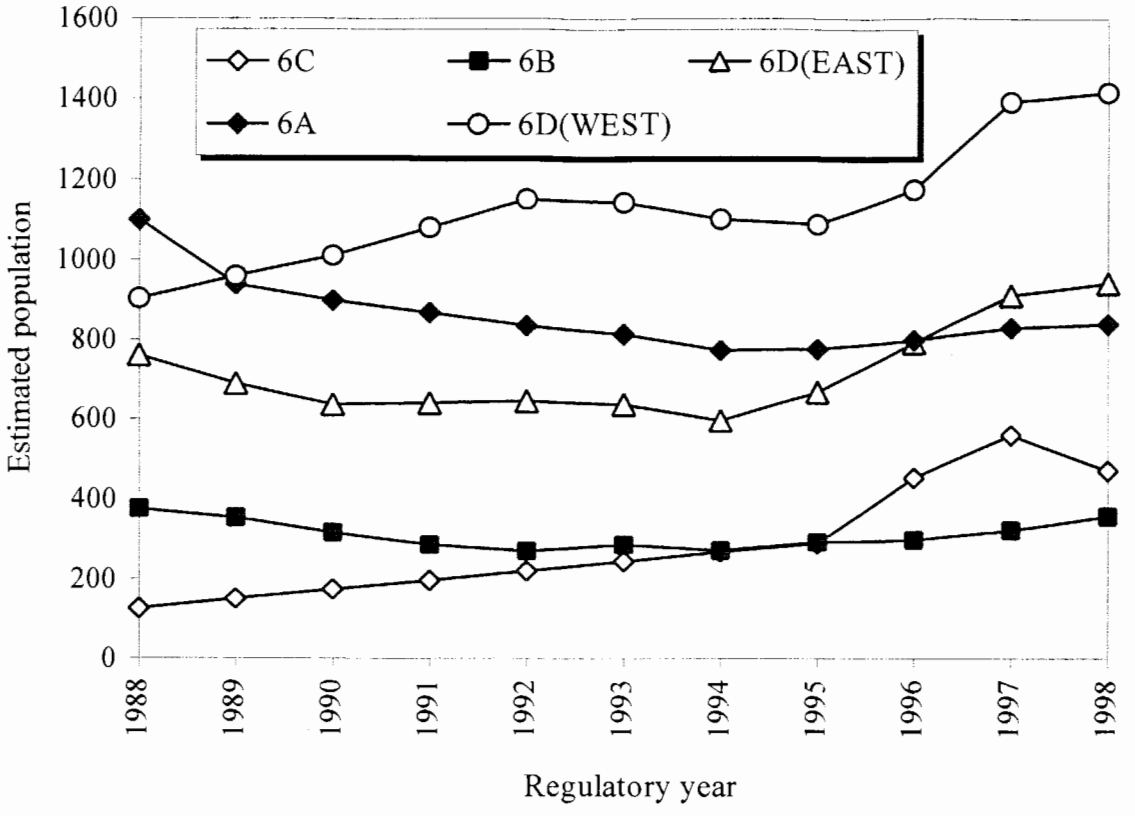


Figure 2 Unit 6 mountain goat estimated population size 1988-98.

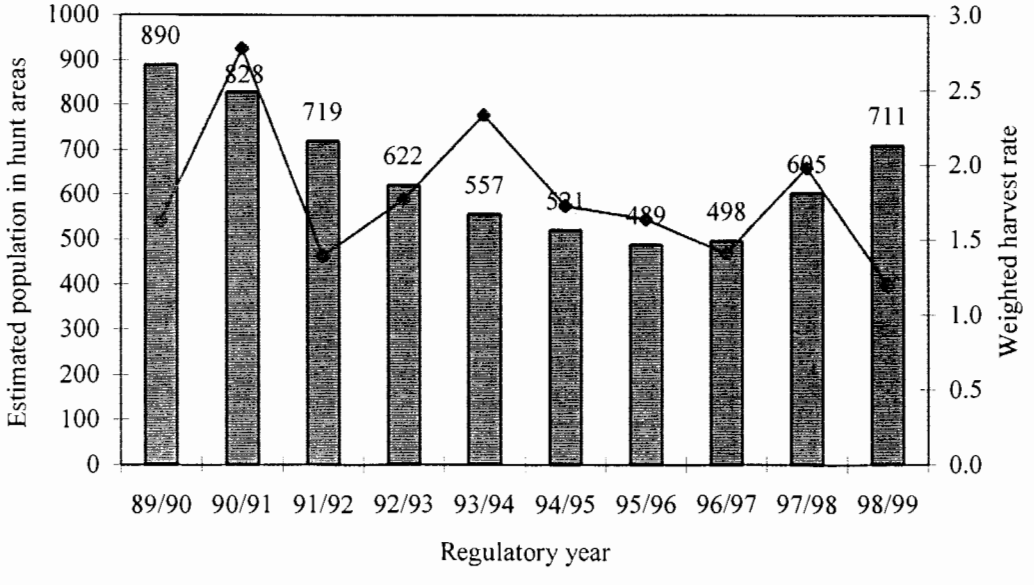


Figure 3 Estimated mountain goat populations and weighted harvest rate in permit hunt areas of Unit 6A, 1989-1998.

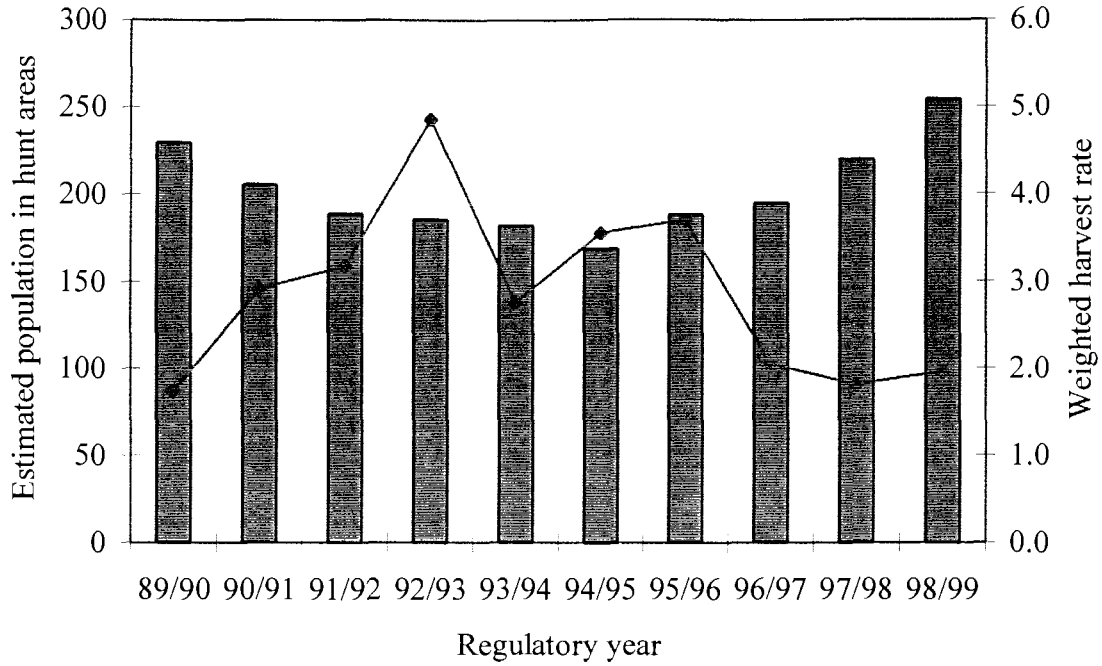


Figure 4 Estimated mountain goat populations and weighted harvest rate in permit hunt areas of Unit 6B, 1989-1998.

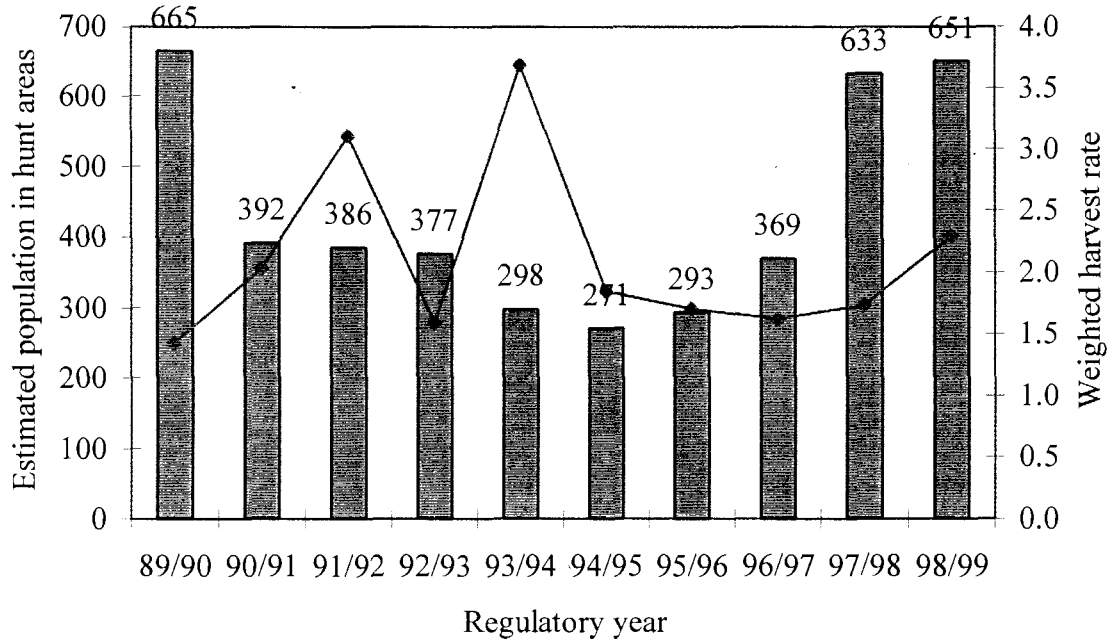


Figure 5 Unit 6D(East) mountain goat estimated population in permit hunt areas and weighted harvest rates 1989-98.

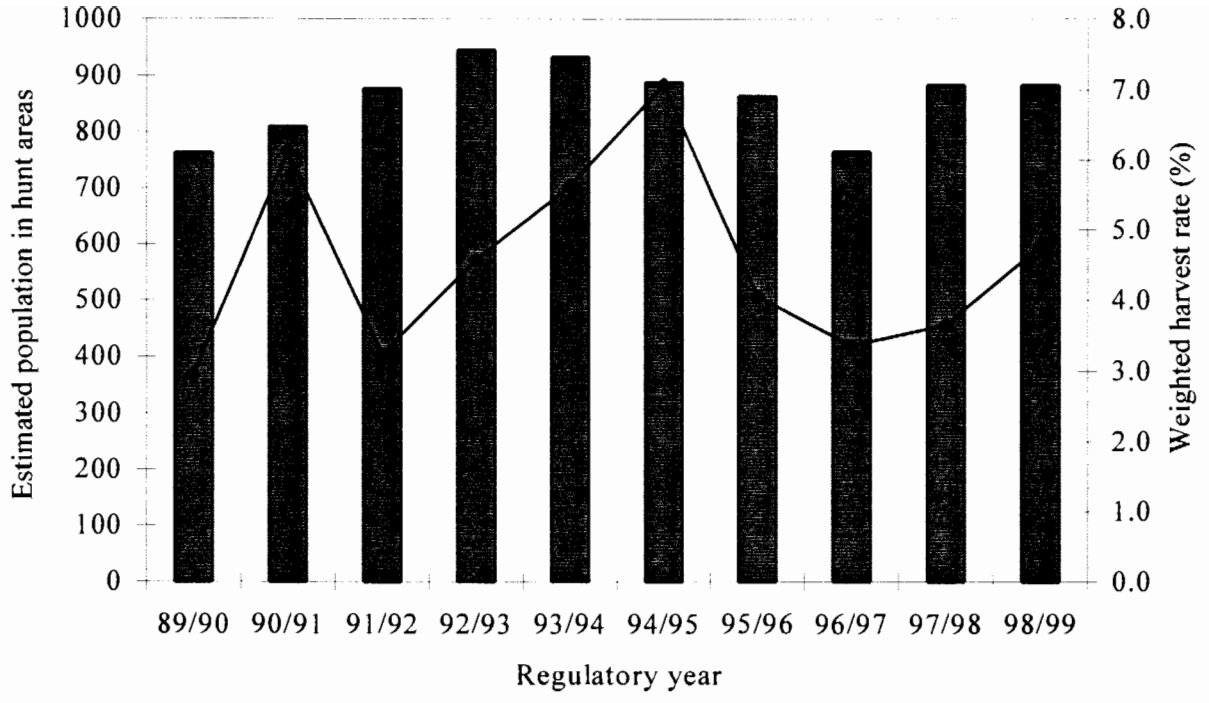


Figure 6 Unit 6D (West) mountain goat estimated population in permit hunt areas and weighted harvest rates 1986–96.

Table 1 Unit 6 summer/fall mountain goat composition counts and estimated population size, 1994–98

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG202	1994/95	--	--	--	--	--	--	--	102
		1995/96	FULL	77	(91)	8	(9)	10	85	94
		1996/97	--	--	--	--	--	--	--	93
		1997/98	--	--	--	--	--	--	--	93
		1998/99	FULL	62	(81)	15	(19)	24	77	92
	Brower Ridge	1994/95	--	--	--	--	--	--	--	46
		1995/96	FULL	31	(84)	6	(16)	19	37	44
		1996/97	--	--	--	--	--	--	--	44
		1997/98	--	--	--	--	--	--	--	43
		1998/99	--	--	--	--	--	--	--	43
	RG204	1994/95	--	--	--	--	--	--	--	181
		1995/96	PARTIAL	110	(88)	15	(12)	14	125	155
		1996/97	--	--	--	--	--	--	--	170
		1997/98	--	--	--	--	--	--	--	185
		1998/99	PARTIAL	138	(85)	25	(15)	18	163	189
	RG206	1994/95	--	--	--	--	--	--	--	237
		1995/96	PARTIAL	32	(86)	5	(14)	16	37	240
		1996/97	--	--	--	--	--	--	--	234
		1997/98	PARTIAL	103	(90)	19	(16)	18	122	226
		1998/99	PARTIAL	55	(93)	14	(20)	25	69	225

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG212	1994/95	FULL	52	(88)	7	(12)	13	59	72
		1995/96	--	--	--	--	--	--	--	82
		1996/97	--	--	--	--	--	--	--	92
		1997/98	FULL	63	(73)	23	(27)	37	86	103
		1998/99	--	--	--	--	--	--	--	108
	RG214	1994/95	--	--	--	--	--	--	--	51
		1995/96	--	--	--	--	--	--	--	54
		1996/97	--	--	--	--	--	--	--	56
		1997/98	PARTIAL	13	(81)	3	(19)	23	19	61
		1998/99	--	--	--	--	--	--	--	64
	RG215	1994/95	FULL	51	(78)	14	(22)	27	65	72
		1995/96	FULL	72	(86)	12	(14)	17	84	92
		1996/97	--	--	--	--	--	--	--	96
		1997/98	FULL	65	(77)	19	(23)	29	84	101
		1998/99	--	--	--	--	--	--	--	105
	Suckling	1994/95	--	--	--	--	--	--	--	10
	Hills	1995/96	--	--	--	--	--	--	--	11
		1996/97	--	--	--	--	--	--	--	12
		1997/98	FULL	8	(62)	5	(38)	63	13	16
		1998/99	--	--	--	--	--	--	--	20

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A		1994/95	--	103	(83)	21	(17)	20	124	773
TOTAL		1995/96	--	322	(88)	46	(13)	14	368	776
		1996/97	--	--	--	--	--	--	--	799
		1997/98	--	252	(79)	69	(21)	27	321	829
		1998/99	--	255	(83)	54	(17)	21	309	847
6B	RG226	1994/95	FULL	103	(83)	21	(17)	20	124	149
		1995/96	--	--	--	--	--	--	--	157
		1996/97	FULL	112	(82)	25	(18)	16	137	151
		1997/98	--	--	--	--	--	--	--	158
		1998/99	FULL	135	(89)	16	(11)	12	151	181
	RG220	1994/95	--	--	--	--	--	--	--	20
		1995/96	--	--	--	--	--	--	--	32
		1996/97	--	--	--	--	--	--	--	44
		1997/98	FULL	44	(86)	7	(14)	16	51	61
		1998/99	--	--	--	--	--	--	--	73
	Goat Mt.	1994-1999	NONE	--	--	--	--	--	--	110
6B		1994/95	--	103	(83)	21	(17)	20	124	273
TOTAL		1995/96	--	--	--	--	--	--	--	294
		1996/97	--	112	(82)	25	(18)	22	137	301
		1997/98	--	44	(86)	7	(14)	16	51	327
		1998/99	--	135	(89)	16	(11)	12	151	363

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6C		1994/95	--	--	--	--	--	--	--	269
TOTAL		1995/96	FULL	206	(83)	41	(17)	20	247	290
		1996/97	PARTIAL	118	(78)	34	(22)	29	152	455
		1997/98	FULL	396	(82)	84	(18)	21	480	560
		1998/99	FULL	359	(91)	34	(9)	9	393	472
6D	RG242	1994/95	FULL	208	(85)	37	(15)	18	245	271
		1995/96	--	--	--	--	--	--	--	293
		1996/97	FULL	248	(78)	72	(23)	29	320	369
		1997/98	--	--	--	--	--	--	--	378
		1998/99	FULL	283	(85)	53	(15)	18	333	386
	RG243	1994/95	FULL	48	(86)	8	(14)	17	56	62
		1995/96	--	--	--	--	--	--	--	83
		1996/97	--	--	--	--	--	--	--	105
		1997/98	--	--	--	--	--	--	--	126
		1998/99	--	--	--	--	--	--	--	148
	RG244	1994/95	FULL	131	(83)	26	(17)	20	157	181
		1995/96	--	--	--	--	--	--	--	203
		1996/97	--	--	--	--	--	--	--	227
		1997/98	FULL	186	(83)	37	(17)	20	223	255
		1998/99	--	--	--	--	--	--	--	265

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D	RG245	1994/95	--	--	--	--	--	--	--	62
		1995/96	PARTIAL	12	(86)	2	(14)	17	14	62
		1996/97	--	--	--	--	--	--	--	65
		1997/98	PARTIAL	35	(81)	8	(19)	23	43	96
		1998/99	--	--	--	--	--	--	--	97
	Heiden Canyon	1994–1999	NONE	--	--	--	--	--	--	55
6D (East)		1994/95	--	387	(84)	71	(16)	16	458	598
TOTAL		1995/96	--	12	(86)	2	(14)	14	14	668
East of Valdez Port, Narrows and Arm		1996/97	--	248	(78)	72	(23)	23	320	793
		1997/98		221	(83)	45	(17)	17	266	912
		1998/99		283	(85)	50	(15)	15	333	952
6D	RG249	1994/95	--	--	--	--	--	--	--	352
		1995/96	FULL	232	(82)	52	(18)	22	284	325
		1996/97	--	--	--	--	--	--	--	406
		1997/98	FULL	347	(76)	109	(24)	31	456	502
		1998/99	--	--	--	--	--	--	--	500

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D	RG252	1994/95	--	--	--	--	--	--	--	188
		1995/96	--	--	--	--	--	--	--	212
		1996/97	FULL	161	(81)	38	(19)	24	199	239
		1997/98	--	--	--	--	--	--	--	291
		1998/99	FULL	249	(87)	37	(13)	30	286	315
	RG266	1994/95	--	--	--	--	--	--	--	348
		1995/96	FULL	236	(85)	42	(15)	18	278	326
		1996/97	--	--	--	--	--	--	--	358
		1997/98	FULL	264	(78)	76	(22)	29	340	382
		1998/99	--	--	--	--	--	--	--	390
6D (West)	Remainder	1994/95	--	--	--	--	--	--	--	213
Valdez, Sargent Icefield, Mt. Castner, Whittier, College Fiord		1995/96	--	--	--	--	--	--	--	225
		1996/97	PARTIAL	23	(72)	9	(28)	39	32	204
		1997/98	PARTIAL	8	(100)	0	(0)	0	8	220
		1998/99	--	--	--	--	--	--	--	220
6D (West)		1994/95	--	--	--	--	--	--	--	1102
TOTAL		1995/96	--	468	(83)	94	(17)	20	562	1089
West of Valdez Port, Narrows and Arm		1996/97	--	184	(80)	47	(20)	26	231	1176
		1997/98	--	619	(77)	185	(23)	30	804	1392
		1998/99	--	249	(87)	37	(13)	15	286	1415

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D		1994/95	--	387	(84)	71	(16)	18	458	1700
TOTAL		1995/96	--	480	(83)	96	(17)	20	576	1757
		1996/97	--	432	(78)	119	(22)	28	551	1970
		1997/98	--	840	(79)	230	(21)	27	1070	2304
		1998/99	--	532	(84)	87	(14)	16	619	2367
UNIT 6		1994/95	--	593	(84)	113	(16)	19	706	3016
TOTAL		1995/96	--	1008	(85)	183	(15)	18	1191	3117
		1996/97	--	662	(79)	178	(21)	27	840	3525
		1997/98	--	1532	(80)	390	(20)	25	1922	4021
		1998/99	--	1281	(87)	191	(13)	15	1472	4049

Table 2 Unit 6 mountain goat harvest data by permit hunt, 1994–98

Unit/ hunt	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsuccessful hunters	Percent unsuccessful hunters	Nr. successful hunters	Percent successful hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A/RG202	1994/95	7	2	29	3	60	2	40	2	(100)	0	(0)	0	2	2	4
	1995/96	11	4	36	4	57	3	43	3	(100)	0	(0)	0	3	3	3
	1996/97	10	2	20	5	63	3	38	3	(100)	0	(0)	0	3	3	3
	1997/98	13	10	77	1	33	2	67	2	(100)	0	(0)	0	2	2	3
	1998/99	20	10	50	8	80	2	20	2	(100)	0	(0)	0	2	2	3
6A/RG204	1994/95	9	5	56	0	0	4	100	3	(75)	1	(25)	0	4	5	10
	1995/96	10	5	50	3	60	2	40	2	(100)	0	(0)	0	2	2	5
	1996/97	6	2	33	2	50	2	50	2	(100)	0	(0)	0	2	2	4
	1997/98	7	4	57	1	33	2	67	2	(100)	0	(0)	0	2	2	4
	1998/99	8	3	38	3	60	2	40	1	(100)	0	(0)	1	2	3	4
6A/RG206	1994/95	4	1	25	2	67	1	33	0	(0)	1	(100)	0	1	2	4
	1995/96	6	1	17	2	40	3	60	3	(100)	0	(0)	0	3	3	3
	1996/97	4	0	0	2	50	2	50	2	(100)	0	(0)	0	2	2	3
	1997/98	7	3	43	0	0	4	100	4	(100)	0	(0)	0	4	4	4
	1998/99	5	3	60	0	0	2	100	2	(100)	0	(0)	0	2	2	5
6A/RG212	1994/95	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	No Hunt	-		-	-	-	-	-	-	-	-	-	-	-	-
	1998/99	10	6	60	2	50	2	50	2	(100)	0	(0)	0	2	2	4
6A/RG215	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	9	2		4		3		2	(67)	1	(33)	0	3	4	4
	1998/99	No Hunt	-		-		-		-		-		-	-	-	-

Table 2 Continued

Unit/ hunt	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A TOTAL	1994/95	20	8	40	5	42	7	58	5	(71)	2	(29)	0	7	9	18
	1995/96	27	10	37	9	53	8	47	8	(100)	0	(0)	0	8	8	11
	1996/97	20	4	20	9	56	7	44	7	(100)	0	(0)	0	7	7	10
	1997/98	36	19	53	6	35	11	65	10	(91)	1	(9)	0	11	12	15
	1998/99	43	22	51	13	62	8	38	7	(100)	0	(0)	1	8	9	16
6B/RG220	1994-1998	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6B/RG226	1994/95	21	10	48	5	45	6	55	6	(100)	0	(0)	0	6	6	6
	1995/96	16	5	31	4	36	7	64	7	(100)	0	(0)	0	7	7	6
	1996/97	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1997/98	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998/99	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
6B TOTAL	1994/95	21	10	48	5	45	6	55	6	(100)	0	(0)	0	6	6	6
	1995/96	16	5	31	4	36	7	64	7	(100)	0	(0)	0	7	7	6
	1996/97	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1997/98	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998/99	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
6C/RG230	1998/99	7	0	0	2	29	5	71	3	(75)	1	(25)	1	5	7	6
6C/RG231	1997/98	12	0	0	2	17	10	83	8	(80)	2	(20)	0	10	12	14
	1998/99	8	1	13	2	29	5	71	4	(80)	1	(20)	0	5	6	8
6C/RG232	1997/98	4	0	0	0	0	4	100	2	(50)	2	(50)	0	4	6	6
	1998/99	6	1	17	4	80	1	20	0	(0)	1	(100)	0	1	2	6
6C TOTAL	1997/98	16	0	0	2	13	14	88	10	(71)	4	(29)	0	14	18	20
	1998/99	21	2	10	8	42	11	58	7	(70)	3	(30)	1	11	15	20

Table 2 Continued

Unit/ hunt	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D/RG242	1994/95	21	11	52	5	50	5	50	5	(100)	0	(0)	0	5	5	5
	1995/96	13	8	62	0	0	5	100	5	(100)	0	(0)	0	5	5	4
	1996/97	23	11	48	6	50	6	50	6	(100)	0	(0)	0	6	6	5
	1997/98	27	17	63	1	10	9	90	8	(89)	1	(11)	0	9	10	11
	1998/99	29	14	48	6	40	9	60	6	(67)	3	(33)	0	9	12	13
6D/RG244	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	25	18	72	7	100	0	0	0	(0)	0	(0)	0	0	0	4
	1997/98	13	10	77	3	100	0	0	0	-	0	-	0	0	0	12
	1998/99	15	8	53	5	71	2	29	1	(50)	1	(50)	0	2	3	12
6D/RG245	1994-1998	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6D (EAST)	1994/95	21	11	52	5	50	5	50	5	(100)	0	(0)	0	5	5	5
TOTAL	1995/96	13	8	62	0	0	5	100	5	(100)	0	(0)	0	5	5	4
	1996/97	48	29	60	13	68	6	32	6	(100)	0	(0)	0	6	6	9
	1997/98	40	27	68	4	31	9	69	8	(89)	1	(11)	0	9	10	23
	1998/99	44	22	50	11	50	11	50	7	(64)	4	(36)	0	11	15	25
6D/RG249	1994/95	59	23	39	21	58	15	42	10	(66)	5	(33)	0	15	20	20
	1995/96	24	15	63	2	22	7	78	3	(43)	4	(57)	0	7	11	12
	1996/97	52	25	48	16	59	11	41	11	(100)	0	(0)	0	11	11	12
	1997/98	66	29	44	16	43	21	57	20	(95)	1	(5)	0	21	22	25
	1998/99	55	21	38	8	24	26	76	25	(96)	1	(4)	0	26	27	25
6D/RG252	1994/95	14	4	29	5	50	5	50	2	(40)	3	(60)	0	5	8	7
	1995/96	24	14	58	3	30	7	70	7	(100)	0	(0)	0	7	7	5
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	21	14	67	4	57	3	43	3	(100)	0	(0)	0	3	3	10
	1998/99	32	23	72	4	44	5	56	4	(80)	1	(20)	0	5	6	10

Table 2 Continued

Unit/ hunt	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D/RG266	1994/95	76	29	43	23	61	15	39	9	(60)	6	(40)	0	15	21	18
	1995/96	44	20	45	15	63	9	38	6	(67)	3	(33)	0	9	12	8
	1996/97	33	11	33	15	68	7	32	4	(57)	3	(43)	0	7	10	8
	1997/98	52	36	69	11	69	5	31	3	(60)	2	(40)	0	5	7	16
	1998/99	62	35	56	18	67	9	33	7	(78)	2	(22)	0	9	11	16
6D (WEST)	1994/95	140	56	40	49	58	35	42	21	(60)	14	(40)	0	35	49	45
TOTAL	1995/96	92	49	53	20	47	23	53	16	(70)	7	(30)	0	23	30	25
	1996/97	85	36	42	31	63	18	37	15	(83)	3	(17)	0	18	21	20
	1997/98	139	79	57	31	52	29	48	26	(90)	3	(10)	0	29	32	51
	1998/99	149	79	53	30	43	40	57	36	(90)	4	(10)	0	40	44	51
6D TOTAL	1994/95	161	67	42	54	57	40	43	26	(65)	14	(35)	0	40	54	50
	1995/96	105	57	54	20	42	28	58	21	(75)	7	(25)	0	28	35	29
	1996/97	133	65	49	44	65	24	35	21	(88)	3	(13)	0	24	27	29
	1997/98	179	106	59	35	48	38	52	34	(89)	4	(11)	0	38	42	74
	1998/99	193	101	52	41	45	51	55	43	(84)	8	(16)	0	51	59	76
UNIT 6	1994/95	202	85	42	64	55	53	45	37	(70)	16	(30)	0	53	69	74
TOTAL	1995/96	148	72	49	33	43	43	57	36	(84)	7	(16)	0	43	50	46
	1996/97	162	72	44	55	61	35	39	32	(91)	3	(9)	0	35	38	44
	1997/98	242	130	54	45	40	67	60	58	(87)	9	(13)	0	67	76	114
	1998/99	268	129	48	64	46	75	54	62	(85)	11	(15)	2	75	88	117

[a] Unweighted harvest; males counted as 1, females counted as 1 and unknowns counted as 1.
[b] Weighted harvest; males counted as 1, females counted as 2 and unknowns counted as 2.

Table 3 Unit 6 mountain goat hunter residency and success, 1994–98

		Successful					Unsuccessful					
Unit	Regulatory year	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
6A	1994/95	0	2	5	7	(58)	0	2	3	5	(42)	12
	1995/96	0	0	8	8	(47)	0	3	6	9	(53)	17
	1996/97	0	0	7	7	(44)	0	2	7	9	(56)	16
	1997/98	0	0	11	11	(61)	0	4	3	7	(39)	18
	1998/99	1	0	7	8	(38)	8	1	4	13	(62)	21
6B	1994/95	1	2	3	6	(55)	2	3	0	5	(45)	11
	1995/96	4	0	3	7	(64)	2	2	0	4	(36)	11
	1996/97	0	0	4	4	(67)	0	1	1	2	(33)	6
	1997/98	0	1	3	4	(80)	0	1	0	1	(20)	5
	1998/99	0	0	5	5	(71)	0	1	1	2	(29)	7
6C	1997/98	13	1	0	14	(88)	2	0	0	2	(13)	16
	1998/99	10	1	0	11	(58)	8	0	0	8	(42)	19
6D	1994/95	8	24	8	40	(43)	14	39	1	54	(57)	94
	1995/96	9	16	3	28	(58)	17	2	1	20	(42)	48
	1996/97	7	14	3	24	(35)	9	27	8	44	(65)	68
	1997/98	13	20	5	38	(52)	15	20	0	35	(48)	73
	1998/99	8	32	9	51	(54)	10	24	7	43	(46)	94
Unit 6 Total	1994/95	9	28	16	53	(45)	16	44	4	64	(55)	117
	1995/96	13	16	14	43	(57)	19	7	7	33	(43)	76
	1996/97	7	14	14	35	(39)	9	30	16	55	(61)	90
	1997/98	26	22	19	67	(60)	17	25	3	45	(40)	112
	1998/99	19	33	21	75	(53)	26	26	12	64	(45)	141

Table 4 Unit 6 mountain goat harvest chronology percent by time period, 1994–98

Unit	Regulatory year	Harvest Periods						*n*
		August	September	October	November	December	January	
6A	1994/95	14	29	43	0	14	0	7
	1995/96	25	38	25	13	0	0	8
	1996/97	29	71	0	0	0	0	7
	1997/98	9	55	36	0	0	0	11
	1998/99	0	63	38	0	0	0	8
6B	1994/95	50	17	33	0	0	0	6
	1995/96	57	29	14	0	0	0	7
	1996/97	100	0	0	0	0	0	4
	1997/98	50	25	25	0	0	0	4
	1998/99	80	20	0	0	0	0	5
6C	1997/98	0	0	93	7	0	0	14
	1998/99	0	0	73	27	0	0	11
6D	1994/95	0	35	63	3	0	0	40
	1995/96	14	46	39	0	0	0	28
	1996/97	54	33	13	0	0	0	24
	1997/98	0	42	50	8	0	0	38
	1998/99	0	35	57	2	2	4	51
Unit 6 Total	1994/95	8	32	57	2	2	0	53
	1995/96	23	42	33	2	0	0	43
	1996/97	54	37	9	0	0	0	35
	1997/98	6	43	55	6	0	0	67
	1998/99	6	38	53	5	2	3	75

Table 5 Unit 6 mountain goat harvest percent by transport method, 1994–98

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*
6A	1994/95	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1995/96	8	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	8
	1996/97	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1997/98	15	(88)	2	(12)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	17
	1998/99	13	(62)	0	(0)	2	(10)	1	(5)	4	(19)	0	(0)	1	(5)	21
6B	1994/95	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	1995/96	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1996/97	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
	1997/98	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	1998/99	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
6C	1997/98	1	(6)	1	(6)	2	(13)	0	(0)	0	(0)	11	(69)	1	(6)	16
	1998/99	0	(0)	0	(0)	1	(5)	0	(0)	0	(0)	17	(89)	1	(5)	19
6D	1994/95	17	(43)	23	(58)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	40
	1995/96	12	(43)	16	(57)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	28
	1996/97	12	(50)	12	(50)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	24
	1997/98	22	(30)	47	(64)	0	(0)	0	(0)	1	(1)	0	(0)	3	(4)	73
	1998/99	42	(46)	50	(54)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	92

Table 5 Continued

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*
UNIT 6	1994/95	30	(57)	23	(43)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	53
TOTAL	1995/96	27	(63)	16	(37)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	43
	1996/97	23	(66)	12	(34)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	35
	1997/98	44	(39)	50	(45)	2	(2)	0	(0)	1	(1)	11	(10)	4	(4)	112
	1998/99	62	(45)	50	(36)	3	(2)	1	(1)	4	(3)	17	(12)	2	(1)	139

Alaska's Game Management Units